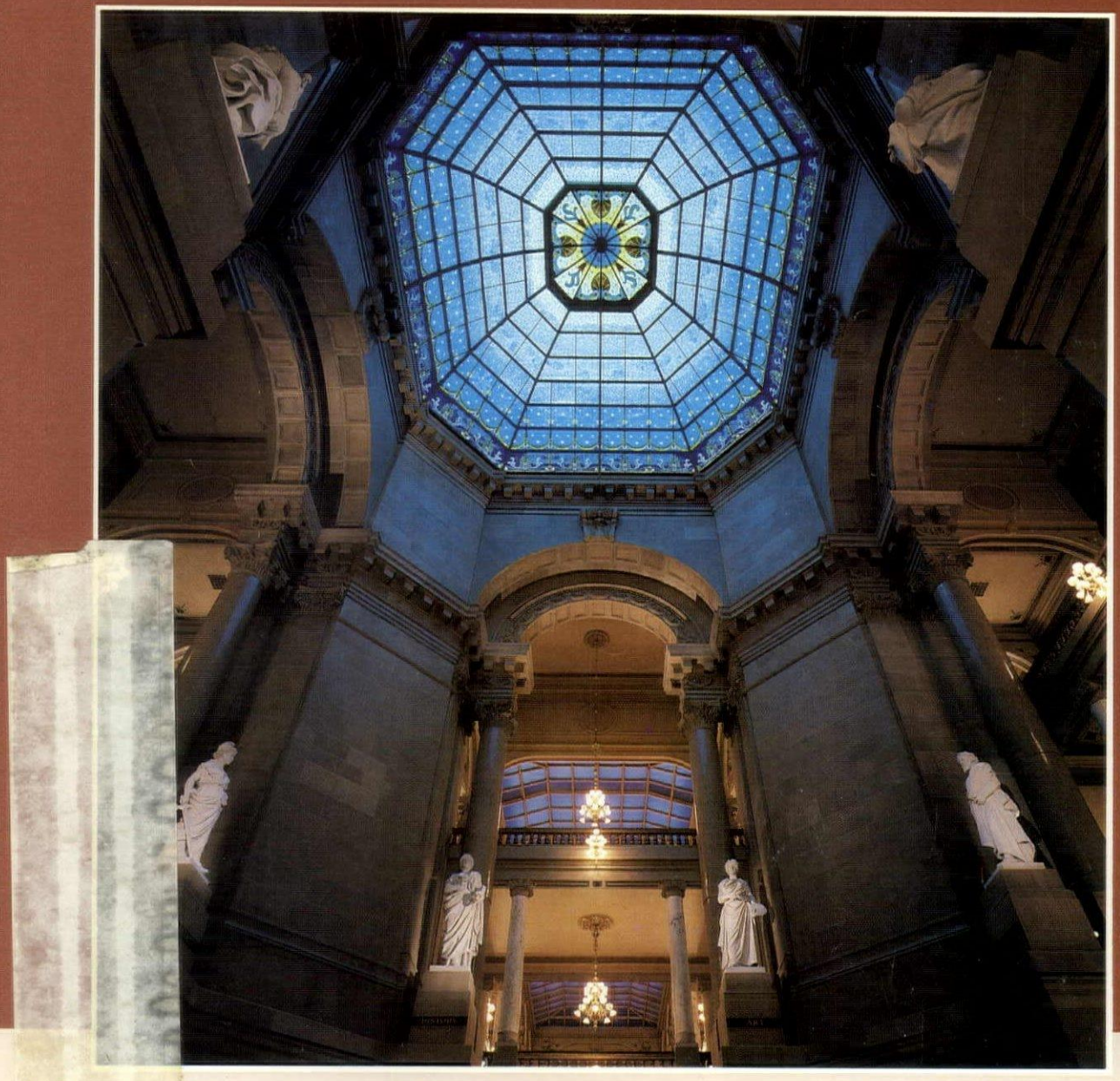
ARCHITECTURAL LIGHTING



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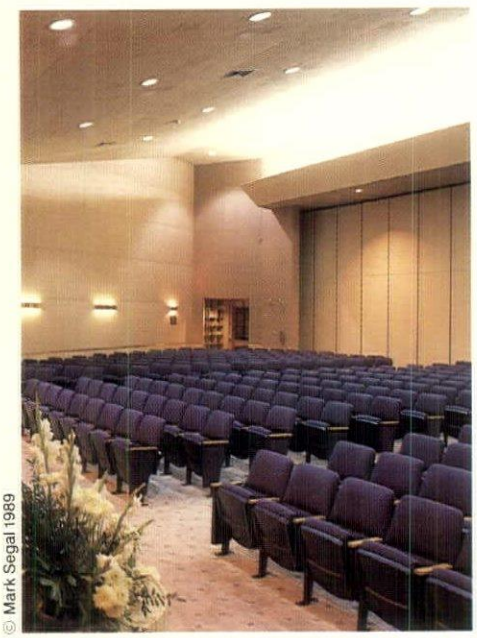

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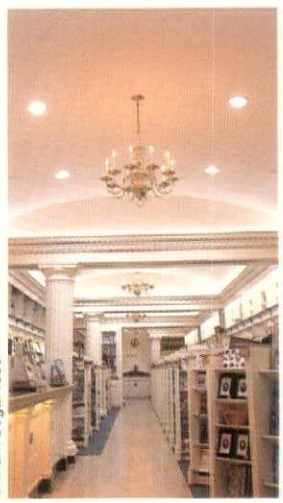

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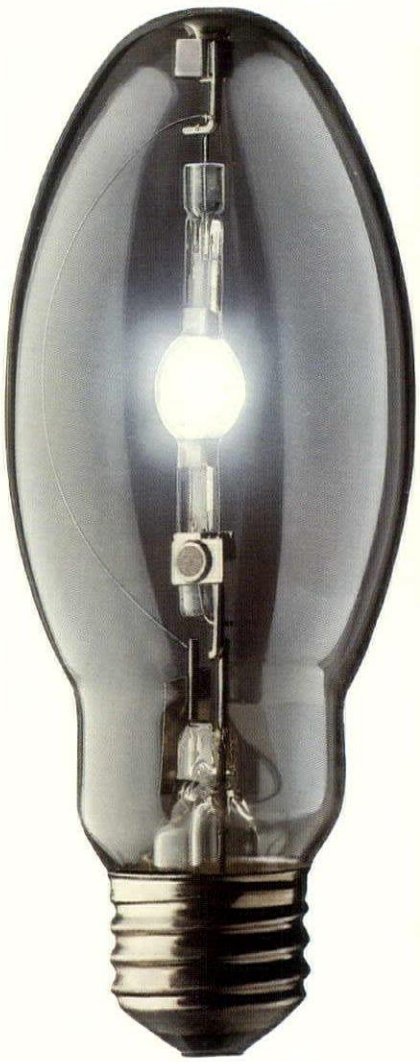

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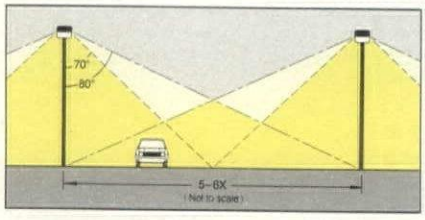

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Circle 4

ARCHITECTURAL LIGHTING

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PROJECTS AND MANUSCRIPTS: All submissions are handled with reasonable care, but the publishers assume no responsibility for the safety of artwork, photographs, or manuscripts. Every precaution is taken to ensure accuracy, but the publishers cannot accept responsibility for the accuracy of information supplied or for any opinion expressed herein.

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From the Editor

Since buyouts and conglomeration are commonplace in both the lighting and the publishing industries, I've always believed that this magazine was destined to be sold to another company. And, sure enough, it has been sold. This issue of *Architectural Lighting* is especially significant to a lot of us, because it is the last one published under the Aster Publishing masthead. Starting next month, *Architectural Lighting* will be published by Gralla Publications.

Gralla Publications is no stranger to architectural publishing. *Architectural Lighting* will join a family of other successful magazines already familiar to designers, including *Contract* and *Facilities Design & Management. Architectural Lighting*'s readers can look forward to great things from its new editor, Wanda Jankowski, whose past experience as an author and editor in the field of lighting already makes her name familiar to many of our readers. I can't think of anyone who could possibly have been more enthusiastic about taking over the editorship of *Architectural Lighting* than my good friend Wanda.

But while I still have the chance, I'd like to make a few acknowledgments. It is difficult to give every group of people who have made this magazine successful the credit they deserve, because it takes so many. A good magazine is the product of a marriage among many parties, from those who contribute editorial material to the advertisers who support it, from the editorial, production, sales, and service staffs who produce it to the readers who, we hope, read it and respond to it.

No design magazine can be any better than the work of its contributors, and I must say that working with the hundreds of designers, columnists, advertisers, and photographers who supplied editorial material to the magazine always made being its editor a joy. Their creativity and the quality of their work make *Architectural Lighting* the wonderful publication that it is and will continue to be.

Another great debt is owed to our advertisers. Their financial support makes this magazine possible — and I am especially grateful to those who had faith in the ideas behind *Architectural Lighting* in its early days, when we had little to offer in the way of "proof" that this magazine could be everything we said it would be.

Much of the excellent writing and copy editing that have made *Architectural Lighting* both interesting to read and very readable was contributed by Jane Ganter, Gareth Fenley, Susan Degen, and Barbara-Jo Novitski. Art director Lee Eide worked tirelessly with thousands of color transparencies to lay out almost every page of the magazine ever printed. Nicole Harris patiently laid out all the product, literature, and calendar sections. Bob Joudanin, Art Rosenberg, and Gordon Exe made it possible for readers to receive this magazine free of charge each month by selling hundreds of pages of display and directory ads. And there are at least a hundred others – reader service and circulation people, proofreaders, typesetters, color separators, printers, and still others – who've each had a hand in producing this magazine and processing the hundreds of thousands of subscription and reader service requests that poured in.

Finally, a few words about the two men who recognized the need for this magazine and made it a reality. Only a handful of design professionals will ever be handed the sort of opportunity and trust given to me by Ed and Michael Aster over the past three years: to start up and edit a major design magazine, mailed to and read by almost sixty thousand of my peers. They took a tremendous risk in hiring an architect who had a few ideas and a lot of enthusiasm, but no experience as an editor. Yet, their confidence and support of my efforts never wavered, and I will always be grateful to them for giving me a truly unique opportunity to serve my profession.

Next month, *Architectural Lighting* will enter a new era, as well as have a new home. I am happy to say I will continue to write and edit articles for the magazine from my home in Oregon, but the magazine has moved to 1515 Broadway, New York City. That's right on Times Square, in the heart of the theater district. That same district is, in a sense, the birthplace of architectural lighting design, since most of those who were the first successful architectural lighting designers started in the theater.

It's funny, but I've gotten the most fantastic sense of satisfaction out of all this. After all, where does one take a show that's become wildly successful somewhere out in the provinces? To *Broadway,* of course!

Charles Linn, AIA

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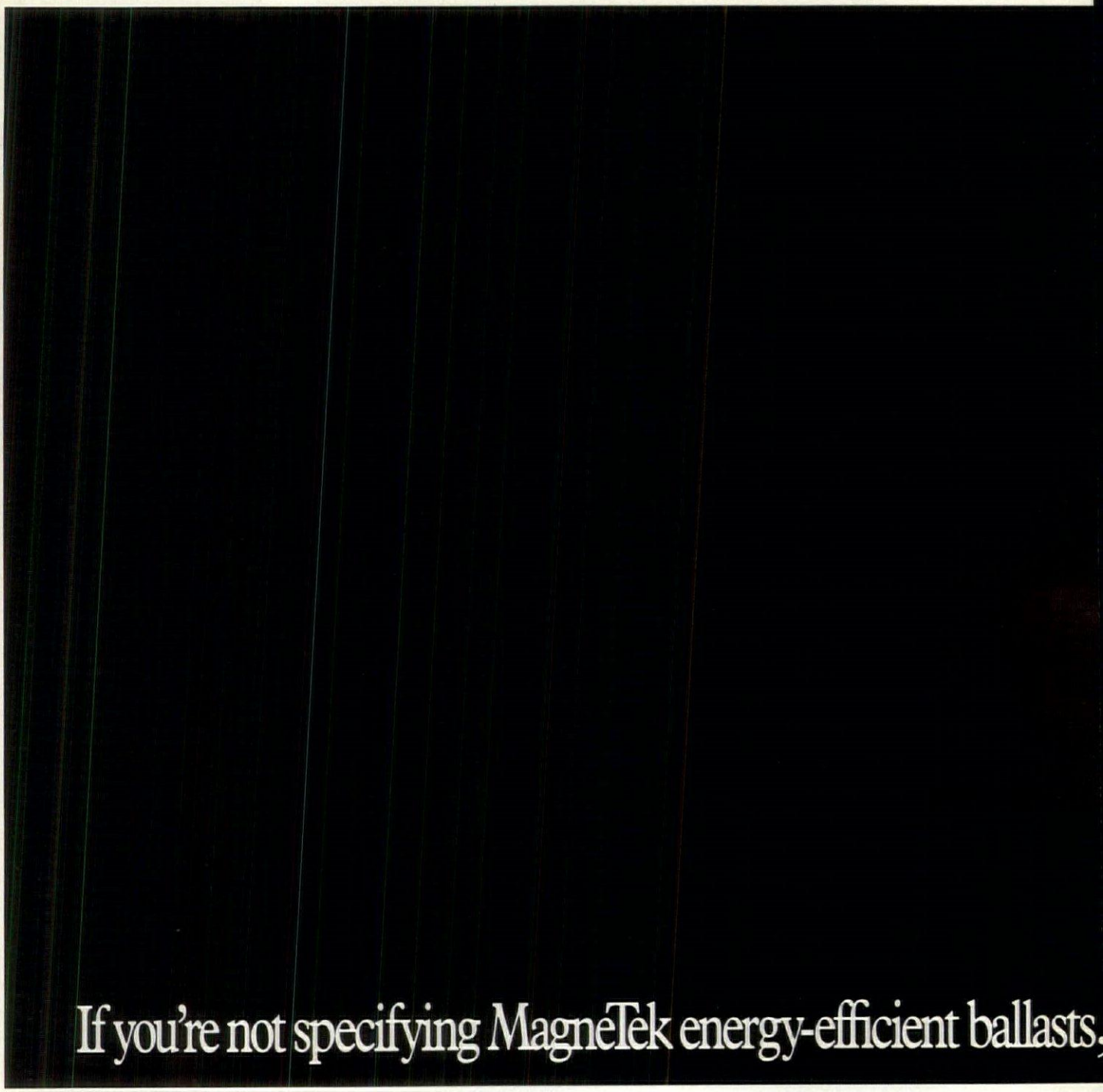

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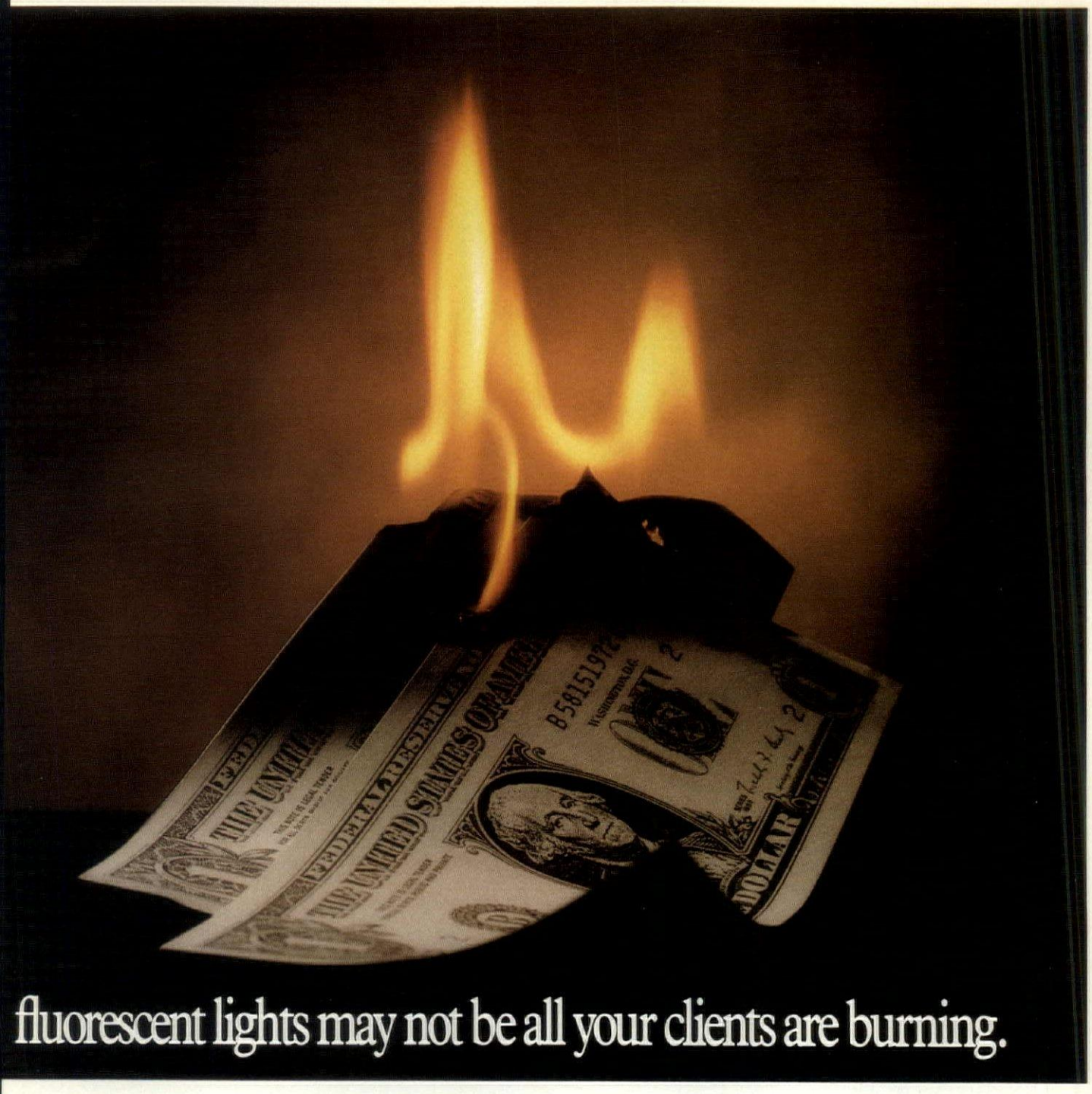

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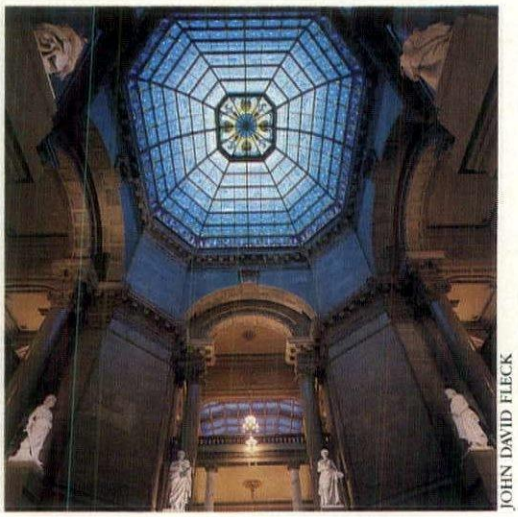
ARCHITECTURAL LIGHTING

October 1989
Volume 3, Number 10



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Circle 10

Letters

Cable clarification

Readers flooded our mailbox to correct an apparent error in the August Landscape Lighting column by Jan Lennox Moyer entitled, "Safely mounting luminaires in trees." Although it seems that the luminaires were mounted in the trees safely enough, several readers questioned the statement that it is safe to run THHN cable underground in conduit to in-grade junction boxes.

According to the National Electrical Code Table 310-13, THHN (thermoplastic, heat-resistant, high-temperature, nylon-jacketed) cable is approved for dry and damp, but not *wet,* locations. But Underwriters Laboratories' *Electrical Construction Materials Directory* defines buried conduit as a wet location, which requires the use of either THW (thermoplastic, heat-resistant, wet-location) cable, or THWN (thermoplastic, heat-resistant, wet-location, nylon-jacketed) cable, according to NEC's Table 310-13. That made it appear that THHN cable is *not* rated for wet locations.

Roger Doeren of Doeren Lighting in Kansas City, Missouri, provided the detail shown in the column. He writes: "I contacted Siegfried Schaumfele, applications engineer at ITT Royal Electric, a cable products manufacturer; Phil Laudicina, electrical engineer at Underwriters Laboratories, Inc.; and John Caloggero, electrical engineer at the National Fire Protection Association, to verify that THHN cable *can* be used underground in conduit, as I suggested.

"Around 1959, 600-volt-rated THW was redesigned as THWN. THW has an insulation thickness of 30 mils. In order to allow more room for wires inside conduit, THWN was produced with a thickness of 20 mils — 15 mils of PVC insulation and a minimum of 4 mils of nylon jacket for physical protection. The temperature rating of THWN is 75 degrees Celsius in wet locations. The same wire can be used in both dry and damp installations, but in this use it carries a higher temperature rating of 90 degrees Celsius and thus acquires the THHN designation. In other words, this one wire is UL83 listed as dual-rated for wet *and* dry uses.

"By 1962, this THHN-THWN wire quickly became the preferred choice for dry- and damp-location conduit feeders over THW wire in the electrical contracting trade and commonly became known as just plain 'THHN.' Of all the major manufacturers of THHN-THWN cable, none makes one listed as THHN only. In fact, this same wire can satisfy UL standards for many classifications, depending on how many times the manufacturer wants to submit it for UL testing and listing. ITT Royal's THHN-THWN cable, for example, is also listed as appliance wiring material (AWM) and machine tool wire (MTW). It is worth noting that many highway departments embed THHN wire in paving material at intersections for self-actuated traffic signals. The wire should survive in conduit quite easily compared with this application, where it must endure vibration, abrasion, and gasoline and oil spills.

"Incidentally, the National Electrical Code for 1990, Article 310, Conductors for General Wiring, will have provisions for a new wire, THWN-2, which will be UL83 listed with a maximum operating temperature of 90 degrees Celsius in both dry *and* wet locations. Overlapping listings and multiratings are common in the insulated wire market. A responsible professional will know how and when to use the right wire for the right application."

Our thanks to Roger Doeren and everyone he contacted for these notes on the finer aspects of cable designations and their ratings. We hope it will prevent the unwary from ripping THHN wire out of underground conduit only to replace it with THWN.

The editors

Lighting a museum exhibit that has to stay dark

Under very low light levels, a priceless collection of 19th-century Navajo textiles was safely displayed for 6 months without fading.

"I wish I had a dark-hole fixture that I could aim to absorb light," muses Dan Howell. Instead, he used 3-inch-long snoots that focus light on the objects to be seen. They absorb much of a lamp's output and evenly distribute the remaining light in a tight, conical beam.

Lighting designer Dan Howell had two days to design the lighting, select equipment, plan a layout, *and* install and aim nearly 100 track fixtures for the 4000-square-foot exhibit. "The first day," he says, "I worked mostly during break and lunch periods, when I could turn out all the exhibit installers' lights. The second day I spent running up and down a ladder. I'd put in a fixture, come down, check light levels, check for shadows, run back up, move the fixture an inch or two, and so on."

Light levels were not to exceed 5 footcandles, but Howell used contrast to make even this dim illumination seem bright. With a brightness ratio of 10 to 1, the textiles stand out dramatically against the darkness.

The transition from the adjacent circulation area into the exhibit was "awfully fast," Howell admits. "You entered from an area with a marble floor lit to over 100 footcandles. I took out the overhead lights outside the exhibit, and inside I made the lighting a little brighter in the very front. I went up to about 20 footcandles on a poster there.

"Sometimes people would complain about how dark it was. Then they'd see the rugs and say, 'Oh! Aren't these wonderful!' I'd go down there just to listen."

—Gareth Fenley

For product information, turn to page 62 and see Manufacturers.

Project: The Hearst Navajo Textile Exhibit
Location: Natural History Museum of Los Angeles County
Lighting Designer: Daniel Howell
Exhibit Designer: Jane Herwegh
Photos: Daniel Howell

Lytesystem 12 A Special Magic

Introducing Lytesystem 12: A halogen low voltage chandelier system designed to bring celestial effects to residential and commercial spaces. The core of the system—a 20W 12 volt T3 lamp—is used with lightforms made of thick pressed and etched glass or gleaming polished chrome with etched glass discs. Lightforms can be suspended from reflective ceiling pans and attached to circular or linear chassis. The 12 volt power feed is safely carried through metal rods; there are no visible wires. The total effect is magical. Lytesystem 12: The future of light, today.

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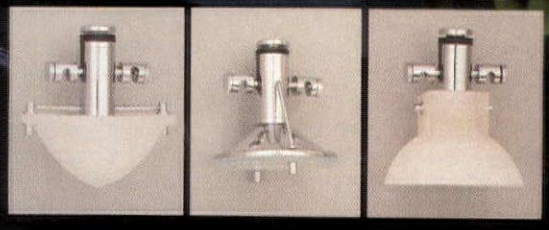

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Circle 12

Seminar room boasts lighting options for special uses

A medical school seminar room uses different lighting systems to aid lectures and panel discussions.
A three-zone, four-scene dimming system controls recessed incandescent accent lights, recessed compact fluorescent downlights, modular fixture panels, and track fixtures. The first scene has most of the room's lights up for general use. The second scene has most of the lights in the room down for viewing slides. The third scene allows slides to be viewed under a low level of illumination, while a higher level of illumination is focused on an adjacent chalkboard. The fourth scene lights the center of the room for panel discussions, while lighting is kept low over seating areas. The motorized, retractable chalkboard and projection screen glide out of sight when users prefer to give the room daylight and a view.

Project: Orentreich seminar room
Client: New York University Medical Center Skin and Cancer Unit
Architect: Larry Bogdanow, L. Bogdanow & Associates
Lighting Designer: Leni Schwendinger, Light Projects
Interior Design: Larry Bogdanow and Warren Ashworth
Photo: Daniel Eifert

Lighting designer Leni Schwendinger drew upon her theatrical background when designing the lighting for the Orentreich seminar room. "I was able to look at the room from a 'performance area' point of view. In a sense, you could call the different areas 'zones,' but I dealt with the lighting in a theatrical way, because the room has so many similarities to a performance space."

Ambient lighting — or, using Schwendinger's allusion to the theater, "house" lighting — is provided by recessed incandescent accent lights with 150-watt PAR 38 flood lamps that wash the wood paneling around the perimeter of the room. During audiovisual presentations, they are dimmed to provide just enough light for note-taking. To save energy and to avoid institutional-looking troffers, other ambient lighting throughout the central part of the room is provided by compact fluorescent downlights. These are also circuited to the dimming system.

Changes in the ceiling height, which increases toward the front of the room, are articulated by a system of modular lighting panels fitted with built-in downlights. Their 150-watt PAR 38 flood lamps illuminate aisles between seating areas.

The "stage" lighting for the blackboard and the front of the room is provided by a row of track fixtures lamped with 150-watt narrow spot PAR 38s. Each leg of the two-circuit track is connected to the dimming system, replicating the flexibility of stage lighting systems. The entire control system can be operated either by a speaker at the podium or by the audio-visual technician at the back of the room.

"In the end," says architect Larry Bogdanow, "I think the client was very satisfied with both the lighting system and the energy budget. For a small seminar room, it has a tremendous amount of lighting, yet because of the fluorescent downlights, it doesn't consume that much energy."

—Charles Linn, AIA

For product information, turn to page 62 and see Manufacturers.

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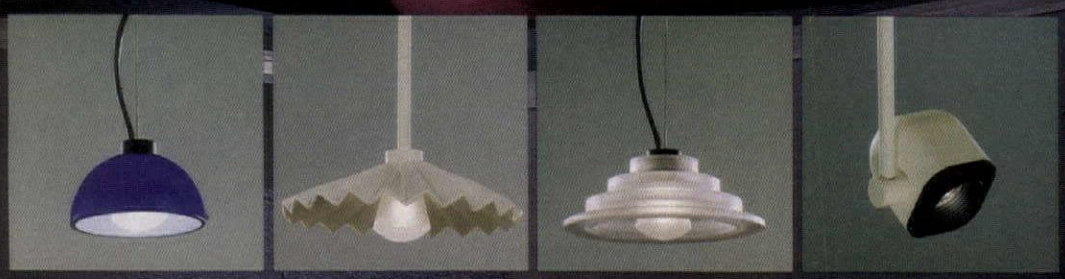

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Circle 13

Low-cost, energy-efficient indirect fixtures please landscape architects

A drafting room in a landscape architect's office uses a shop-built indirect fluorescent lighting system.

"From my experience with fluorescent coves," says lighting designer Wilson, "I knew that keeping the lamps 18 inches below the ceiling was critical in allowing an even wash of light on the ceiling surface and effectively reflecting the light down to the work surface."

Pamela Hull Wilson had a dilemma. Her clients had grown to like the indirect lighting and high ceilings they had in the office space they were occupying. But now they would be moving into a new space, with a lower ceiling and a tight budget for lighting equipment. Finding several manufactured linear fluorescent uplight systems to be cost-prohibitive, Wilson designed a system from scratch that could be built and operated inexpensively and would meet the clients' expectations.

In collaboration with interior designers Hermanovski Lauck Design, Wilson designed a plywood housing that is triangular in section. The assembly was prefabricated in 8-foot lengths, using two rows of single tube, 8-foot fluorescent strips with 3000K lamps. The rows of fixtures were suspended 10 feet on center using aircraft cable. The upper legs of the triangular shape hide the lamps from view and provide a surface to reflect light onto the ceiling. The interior surfaces of the fixtures were painted matte white.

In order to convince her clients that the system would work, Wilson mocked up an 8-foot section and installed it in the unfinished space, temporarily placing ceiling tiles directly over the mock-up and extending them 5 feet out on both sides. "It was crude, but it illustrated that we would achieve acceptable light levels and distribution. Once the space was complete, the light level improved dramatically, and we have light-colored work surfaces throughout the rest of the space." According to Wilson, the system provides 50 footcandles of shadow-free light at the work surface while using less than 2 watts per square foot.

The installed cost of the fixture was about $12.50 per linear foot, although Wilson notes that finishing and installing the system is "trickier than it looks," and wonders if the bid "might be a bit higher," should the design be used again.

—Charles Linn, AIA

Project: Offices
Client: Johnson, Johnson & Roy Landscape Architects
Location: Dallas, Texas
Lighting Designer: Pamela Hull Wilson, IALD
Interior Designer: Hermanovski Lauck Design
Photos: James F. Wilson

For product information, turn to page 62 and see Manufacturers.

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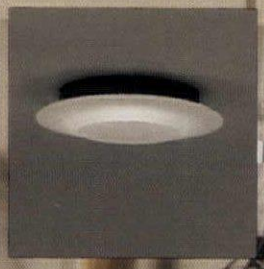

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Circle 14

Linear light pipe puts cars in a different light

An innovative lighting technology combines the brightness of point sources with the suffusion of distributed sources.

Designers wanted to develop a lighting scheme for the main entrance lobby of BMW's North American corporate headquarters that would create a welcoming environment for visitors, highlight the sleek lobby architecture, be compatible with daylight, and show off the fine metalwork of the automobiles on display. Because point sources tend to create hot spots on the cars' metal finishes, the lighting designers selected diffusing material for the skylight and experimented with an innovative lighting technology. The unusual design process included the participation of BMW executives on factory field trips and a full-size design mock-up, complete with several automobiles.

Project: Corporate headquarters
Client: BMW of North America
Location: Woodcliff Lake, New Jersey
Architect: CUH2A; Thomas Lyman, lighting designer; Allen Weiss, director of electrical engineering
Photos: Wolfgang Hoyt

To achieve high levels of illumination without point sources, CUH2A's designers decided to experiment with linear light pipe. In appearance, the light pipe is a long, uniformly bright, rectangular tube. The fixture's highly reflective lining traps the light of high intensity discharge sources and allows it to escape uniformly through prismatic material along its length. The exterior diffusing material contains varying amounts of additive on the bottom, top, and sides to moderate the amount of light that emanates from each orientation.

The installation includes three 40-foot fixtures that form a strong architectural presence in the lobby space. Each is 12 inches wide and 18 inches high. Four 1000-watt metal halide PAR lamps, two at each end of the tube, produce up to 70 footcandles on the display below. The highly efficient lamps were chosen because their 4000K color temperature is similar to that of daylight. In addition, their relatively high color rendering index of 80 accurately displays the cars' finishes. Each pipe has holders for dichroic filters to correct any future color shift.

The light pipes provide bright light without unwanted hot spots. Electrical engineer Allen Weiss describes their effect: "Obviously, you need to shine light on the car in order to make it sparkle, but you need to do it in a way that does not detract from the metal surface. The light pipe takes the candlepower distribution and suffuses it over a very large area. The apparent brightness is much less than one would see with a point source."

—Barbara-Jo Novitski

For product information, turn to page 62 and see Manufacturers.

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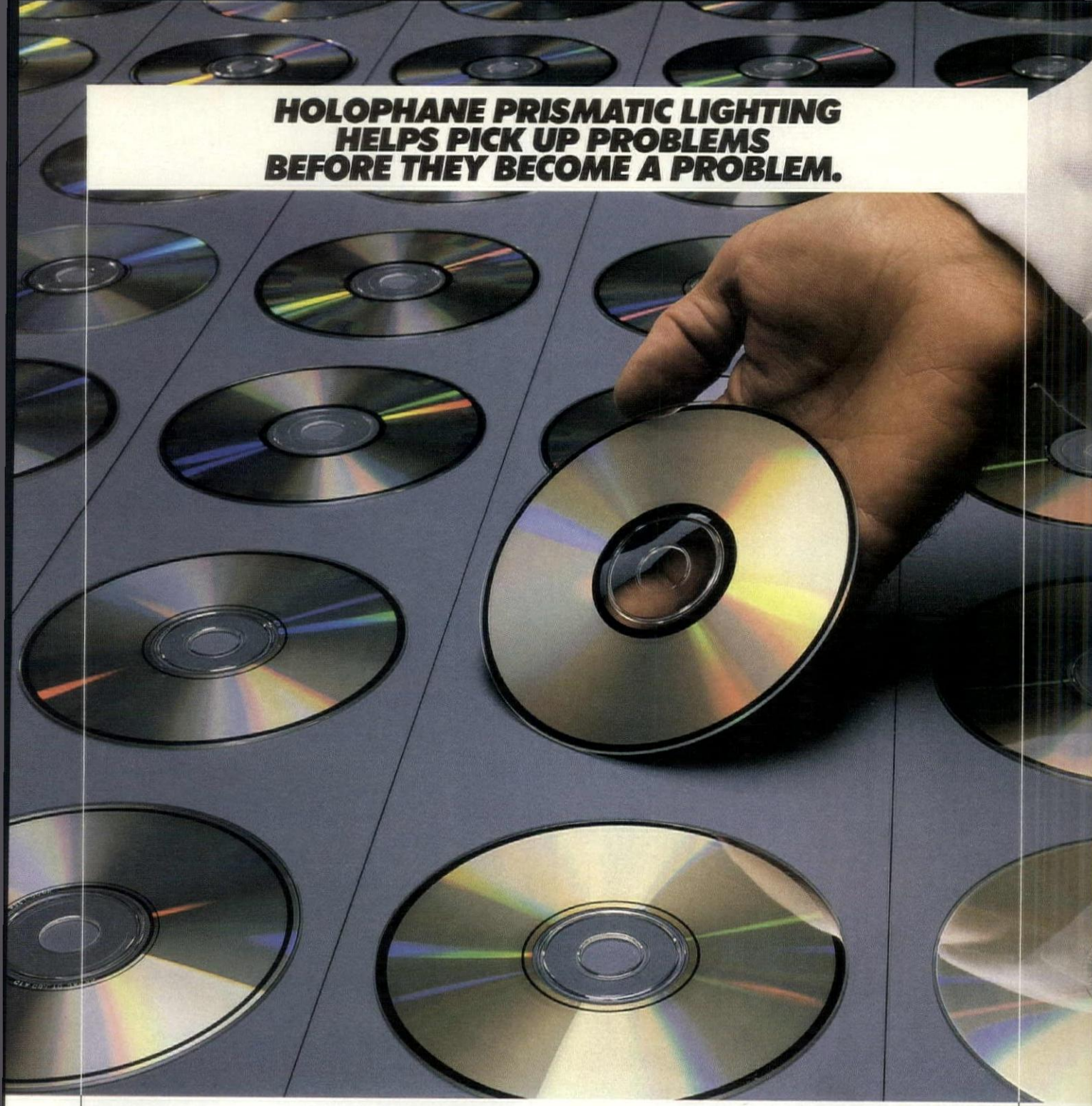

Industrial illumination is more demanding than almost any other application. Contrasts are lower, action takes place over a far greater vertical range, and glare is inescapable when task location or angle can't be adjusted.

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Circle 15

PORTER PAINT COMPANY

Century-old lighting system restored in historic state capitol

ARTICLE BY
DAVID J. DIXON, AIA

The state of Indiana recently celebrated the centennial of its magnificent capitol by renovating the structure's lighting systems. It was the largest state capitol in the country when completed in 1888, featuring a monumental rotunda and two atria gaslit with elegant brass chandeliers and sconces.

In the century since then, however, the rotunda and the historic fixtures in the building have suffered damage, neglect, and insensitive modernization. Charged with renovating the lighting, we concentrated on the large public areas of the building: its two three-story atria and the memorial space under the rotunda's 135-foot-high colored glass dome. Our goal was to recreate the original splendor of the building.

We conducted extensive research in the historical archives and analyzed existing conditions in the building so that we could reconstruct its original appearance, atmosphere, and detailing as closely as possible within constraints of the budget and modern technology. The restoration included reproducing the original light fixtures, selecting light sources to replicate the original appearance and color of gaslight, minimizing all modern intrusions, and making sure that any lighting required to augment the historic chandeliers would be as inconspicuous as possible. We also installed a dimming system that would control the light sources to extend lamp life and recreate the illumination levels of the original gaslights for special events.

Project: Indiana State Capitol restoration
Location: Indianapolis
Architect: The Cooler Group, Inc.; Harry E. Cooler, David J. Dixon, Joseph E. Raper
Electrical/Mechanical Engineer: A.D.S., Inc.; Herman T. Tilly, Lawrence R. Simmerman, Thomas E. Endicott

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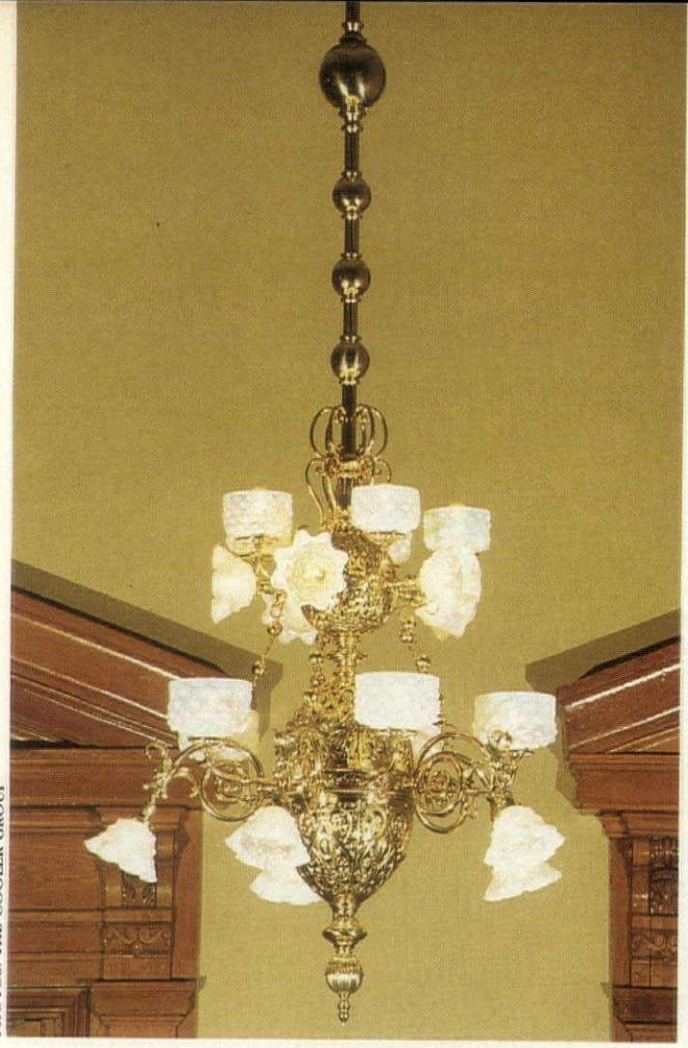


PHOTOS: THE COOLER GROUP

Chandeliers in the three-story atria (facing page) were restored to their original 19th-century appearance. Existing original chandeliers (above left) and sconces (above right) were repaired and cleaned, while reproductions were made to replace those that had been lost. Luminaires were relamped with 70-watt clear, energy-saving, vertical-filament A lamps because their light resembles gaslight, when dimmed. Viewed through the glass shades, the filaments look like gas jets.

Lighting Restoration

The two large atria and central rotunda that dominate the building's interior were originally illuminated by 131 yellow brass chandeliers and sconces. Installed in 1886, the fixtures were designed to operate on both gas and electric power. At the time, the city of Indianapolis had several electric companies, but none could produce an amount of power sufficient to serve the large capitol in addition to existing customers. State officials had reviewed the possibility of a separate generating facility, but this would have been prohibitively expensive. As a result, the fixtures were powered by natural gas until shortly after the turn of the century. When local power companies began to produce enough electricity to accommodate the building, the electrical service to the luminaires was installed and the gas supply removed.

Only 40 of the original chandeliers remained because most of the original luminaires had been replaced over the past century. No original sconces survived in the capitol, but one was found in a private Indianapolis residence after an extensive search. Before the renovation, the building had been illuminated primarily by small, modern chandeliers hung in the mid-1960s.

Through research and analysis, we learned of the original locations and construction details of the chandeliers and sconces. We then determined ways to recreate these fixtures with modern techniques. To determine the original gaslight illumination levels, we took light meter readings from the one surviving sconce and calculated the output for each fixture type. Once we had established these light levels, we knew how much we would have to dim the renovated electric fixtures in order to recreate the light levels of the original gaslights. These calculations also helped us determine where additional fixtures would be needed to supplement the chandeliers and sconces.

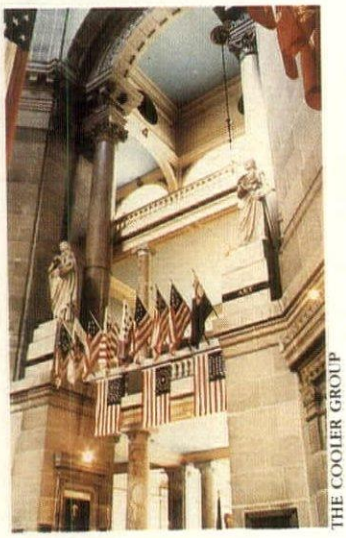
The 40 remaining original chandeliers required extensive rehabilitation. They were removed, dismantled, cleaned, polished, and lacquered. Damaged or missing parts and crystal shades were replaced, then each chandelier was reassembled. Molds and dies made during rehabilitation of the existing chandelier pieces were used to create 91 new chandeliers to replace those that had been removed and destroyed. Thirty-two yellow brass sconces were also replicated, using the one surviving sconce as a model. The rehabilitated chandeliers and sconces were fully wired to meet modern UL standards, and all the original gas jet locations were fitted with electrical sockets.

Both types of fixtures contained ornate filigree balls that complicated the casting process for the replication. During our research, we discovered that the designers had originally intended to create a cast chandelier, but budget constraints had forced them to use a spun material that was hand stamped and detailed. Current technology and the cost of hand tooling have made cast pieces less expensive to produce, so the replicated chandeliers and sconces are more consistent with the designers' original intent than the original fixtures were.

The fixtures required a total of 2,457 incandescent lamps. We used 70-watt clear, vertical-filament, energy-saving A lamps because, when dimmed, they produce a color similar to that of gaslight. The lamp filament also looks like a gas jet when it is viewed through the fixtures' glass shades and is constructed to provide a stable source when dimmed to very low levels.

In designing and engineering the illumination of the capitol, we determined that the original fixtures, even at their highest light level, would not provide enough illumination to meet current codes and standards for a modern office building.

JOHN DAVID FLECK



THE COOLER GROUP

The large dome of colored art glass (above) is toplit by windows in the exterior dome. The rotunda has monumental limestone arches at entrances and eight Carrara marble statues that honor the citizens of Indiana (below).

Although we knew that supplementary light would be required, we wanted to make sure it was consistent with the historic nature of the building. We decided to use simple, nonintrusive can fixtures for additional lighting. Unfortunately, the floor construction did not permit us to recess these fixtures, so they were installed at the ceiling level.

Wiring the rehabilitated fixtures also caused problems. The existing wiring ran in surface-mounted raceways on the walls and ceilings. Providing power to the new and rehabilitated fixtures required temporarily removing more than a mile of marble floor tiles so that new conduit could be embedded in the concrete below.

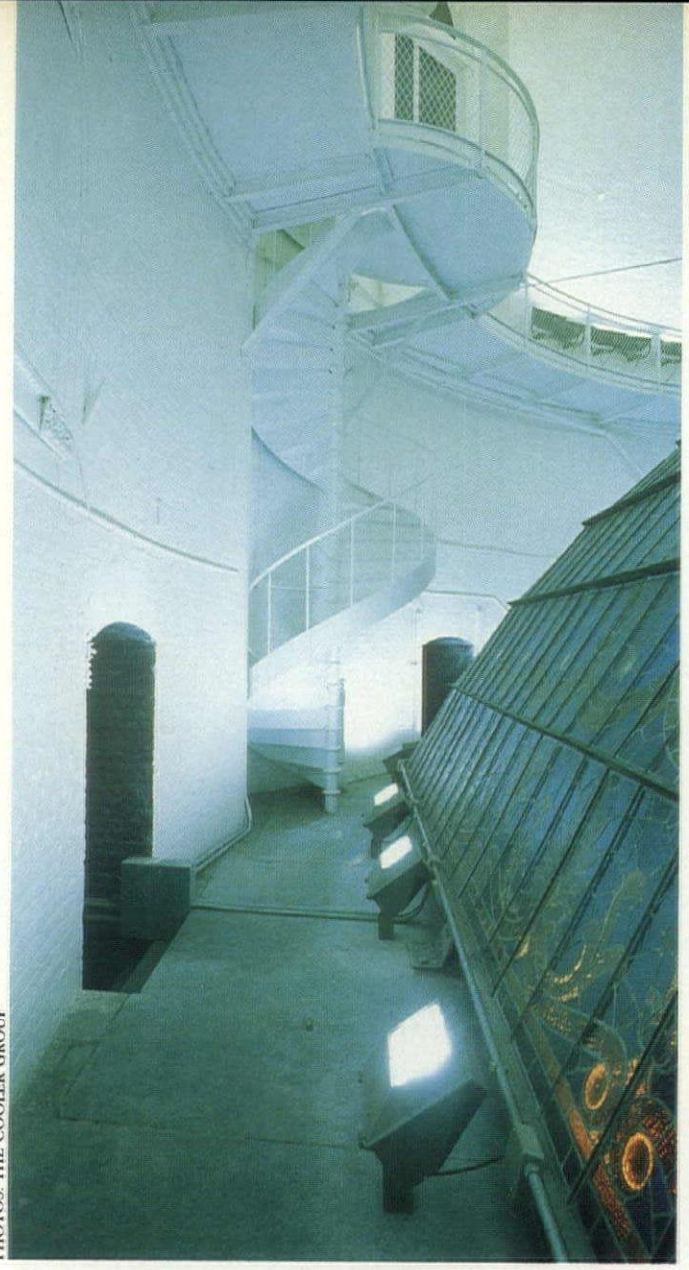
Rotunda Renovation

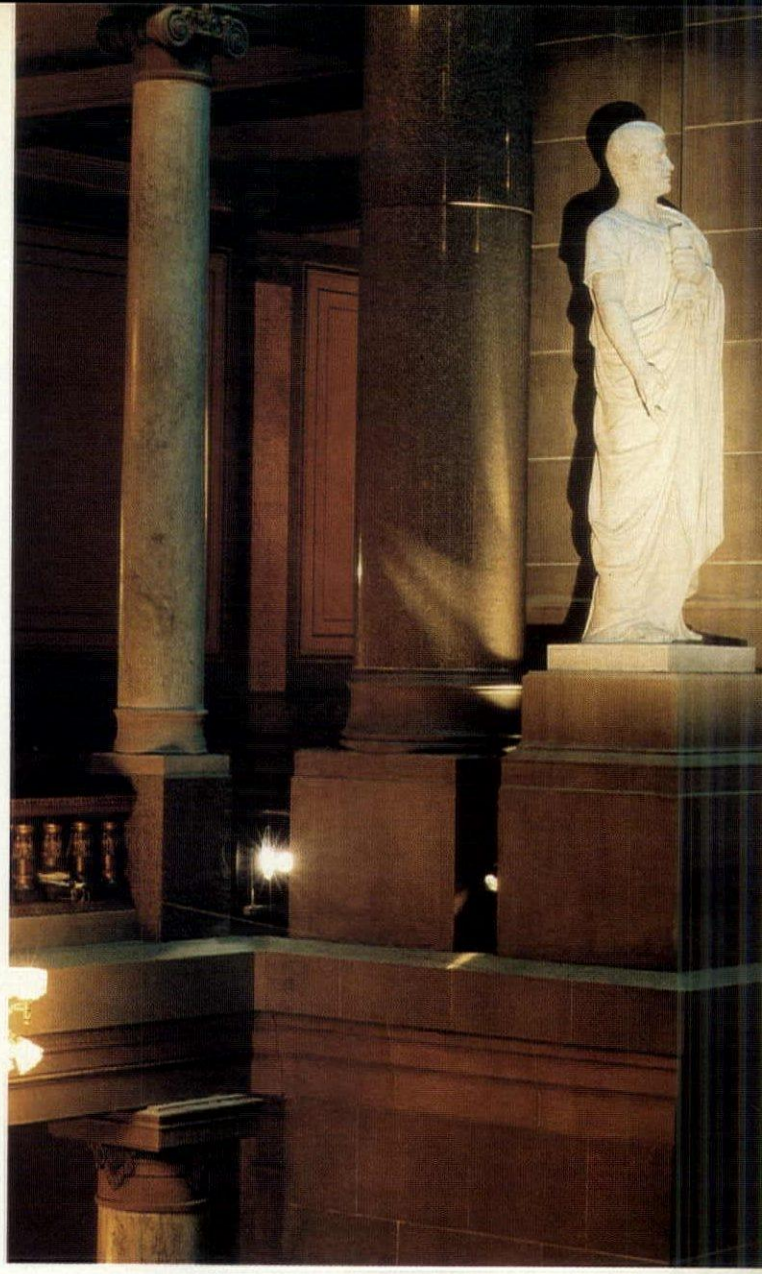
Illuminating the rotunda posed a different set of problems. Designed as a memorial to honor the citizens of Indiana, the rotunda is dominated by a monumental limestone arch at each of its four entrances and eight 18-foot-high statues of Carrara marble. Its walls have numerous niches for plaques and artwork.

Capping the 135-foot-high rotunda is a large dome of colored art glass. In the past, large windows were used, unsuccessfully, to illuminate the glass dome. At night and on cloudy days, the rotunda became a dark, unattractive area of the building. State officials asked us to design a system that would illuminate the dome uniformly, so visitors could appreciate this magnificent element.

Our design goals were to illuminate the colored glass dome without hot spots and make the light sources inconspicuous. We installed a two-piece reflective vinyl awning above the dome and had the interior walls of the upper dome barrel painted a reflective white. Forty-eight metal halide floodlights were installed between the lower glass dome and the reflective awning. Selected for their color and dimmability, they wash the awning and upper walls in high-intensity light, giving the impression that the art glass is backlit by strong, constant daylight.

State officials also wanted the area under the dome to be fitted with accent lighting for the statuary, plaques, and arches. They requested that the system be designed for easy maintenance and that the color and source of the light not detract from the beauty of the rotunda. Planning this illumination system required calculating where to locate fixtures so that they would highlight the statues and limestone arches. We used theatrical ellipsoids with projector lamps, selected for their specific illumination qualities and because they could be concealed





PHOTOS: THE COOLER GROUP

The colored art glass dome rises 135 feet above the floor level of the rotunda. Forty-eight metal halide floodlights illuminate the highly reflective white surfaces in the cavity between the art glass dome and the exterior dome. The floodlights create a wash of high-intensity light and can be dimmed to four different light levels, including one that simulates gaslighting. The marble statues are illuminated by 600-watt theatrical ellipsoids with framing shutters, focusing controls, and mirrors. Attached in front of each fixture, the mirrors reflect the light across the rotunda, illuminating the statue on the opposite side. The cross illumination casts shadows on the statues, bringing out their details.

and would not detract from the historic quality of the space.

The tall marble statues are illuminated by 600-watt theatrical ellipsoids with framing shutters and focusing controls. This fixture system was installed at the base of each statue behind the large supporting columns. Mirrors installed in front of each fixture reflect light across the rotunda, illuminating the statue on the opposite side. This cross illumination casts shadows across the statues, bringing out their details. A protective metal cover conceals each fixture from public view and protects it from possible tampering. Eight additional theatrical ellipsoids are directed toward the monumental limestone arches that frame the inner rotunda. They highlight the ornate stonework which, until this renovation, was difficult to see.

The most challenging lighting design in the rotunda area was the illumination of 12 plaque recesses around the rotunda. Eight of them are illuminated by 300-watt ellipsoids installed behind the statue bases and aimed at a high angle toward the recesses. We carefully calculated each fixture location and angle of projection so that the plaques could be illuminated without shadows and without light beams interfering with the plaques' visibility. The four recesses that could not be illuminated by this projection technique were sidelit with linear incandescent strips; power cables to these fixtures were surface-mounted and painted to match the surrounding limestone. We fine-tuned locations, intensities, and lamps on site after the fixtures were installed. The entire illumination system underwent thorough testing and balancing before the public opening.

An automated four-scene control system that is connected to the building's central computer allows separate dimming of statue, plaque, and arch lighting. Ten dimmer panels located throughout the building are preset for four light levels: standard office lighting, high-level lighting for cleaning and maintenance, emergency lighting, and, for special functions, a level that recreates 19th-century gaslighting.

Our reward for the difficult planning, research, and implementation of these systems is a lighting design that is the crown jewel of the centennial restoration of the Indiana State Capitol. The dramatic lighting of the rotunda allows the citizens of Indiana to appreciate the grandeur of this memorial space. ■

For product information, turn to page 62 and see Manufacturers.

Landscape and seascape lighting in a tropical paradise

Kenneth E. Yarnell, IALD

Ken Yarnell is vice president of JDA Lighting Design Inc., New York City.

Bringing the beauty of a tropical landscape indoors was the goal when Hyatt undertook an extensive renovation program to revitalize portions of its two Puerto Rican hotels. We worked with architects Culpepper, McAuliffe and Meaders to complete a restaurant and a ballroom with an exterior terrace. Subtle and elegant interior lighting and dramatic landscape lighting enhance the architectural composition of a tropical paradise. "Our main goal was to create an uninterrupted visual flow between the indoor garden and the outdoor paradise," architect Jim Culpepper explains.

In the Medici Restaurant's main dining room, the focus is a spectacular view of the landscaping just beyond a huge window wall. A waterfall and freshwater pond with black swans and imported koi goldfish are nestled in a setting of palms, ficus trees, ground cover, and tropical flowers.

In the dining room interior, the architects used detailing of a Northern Mediterranean style. Terra-cotta tile, bleached woods, and a palette of soft colors provide an airy atmosphere and the feeling of a Pompeiian garden terrace. We placed small-aperture recessed MR16 accent lights in the 16-foot ceiling to provide the soft ambience the architects desired. In addition, these lights subtly emphasize artwork and cast pleasant shadows through a delicate arched trellis in the belvedere.

To allow an uninterrupted view of the landscape beyond the window, we took care to avoid highlighting objects that would cause distracting reflections on the large window wall. The evening meal is served under very low light levels. Oil lamp "candles" on each table cast a pleasant glow on relaxed faces. Tiny MR16 uplights in each planter highlight trees and bring the drama of the landscape indoors.

Just outside the walls, corrosive salt in the atmosphere and soil made necessary the use of simple, heavy-duty fixtures. To avoid potential problems, no electronics, transformers, or ballasts were used. Instead, we chose fully enclosed and gasketed PAR-lamp fixtures in surface-mounted applications. For shielding, we took advantage of natural ground cover and careful site location. Because of their relatively short, 2000-hour life, the lamps require frequent replacement; we believe this will ensure that the lighting system is well adjusted and maintained. Special highlights on the large ficus trees, fan palms, and waterfall bring the outdoors into view and create the dining ambience of a tropical paradise.

Gazebo, Terrace, and Ballroom

A short ride away at a companion hotel, a similar design concept links the indoors with the surrounding landscape by integrating a new gazebo and terrace with the ballroom. The Salon del Mar and Terrace del Mar are used for banquets, wedding receptions, meetings, presentations, and other social gatherings for groups of up to 300 people. Rich woods, fine marble, crystal chandeliers, and lush fabrics make the space

Interior lighting at the Medici Restaurant does not cause distracting reflections on a window wall, allowing an uninterrupted view of the landscape beyond.

Projects: Medici Restaurant, Hyatt Regency Cerromar Beach; Salon del Mar and Terrace del Mar, Hyatt Dorado Beach
Location: Dorado, Puerto Rico
Client: Hyatt Hotels Corporation
Architect: Culpepper, McAuliffe and Meaders, Inc.; James Culpepper, AIA, Robert Meaders, AIA, Mazie Wiepper
Landscape Architect: Edward D. Stone, Jr. and Associates; John Miller
Lighting Designer: JDA Lighting Design Inc.; Kenneth E. Yarnell, IALD
Electrical Engineer: Grumman/Butkus Associates
Photos: Rion Rizzo, Creative Sources Photography, Inc.

warm and inviting.

A north-facing glazed wall with three large double doors and delicately curved mullions provides a breathtaking scene of the new terrace and gazebo with palm trees framing an ocean view beyond. As evening falls, three large crystal chandeliers provide general lighting along with incandescent downlights. Accent lights and wall washers highlight the wood columns and decorative Spanish tile wall. When the doors are opened, the ballroom crowd flows out to the terrace to enjoy the stars and surf.

On the terra-cotta tile terrace, a large gazebo and two trellises are built of copper columns and natural wood latticework. The romantic setting is a wonderful place for a small wedding or cocktail party. Ambient light is provided by sconces and post lights that feature natural copper domes. Tiny downlights are also hidden among the slats of the trellis.

Uplights, downlights, sconces, and post lights combine to create a romantic outdoor setting at the Terrace del Mar. Guests seated under crystal chandeliers inside the Salon del Mar have a view of palm trees framing the ocean shore. At night, the surf is lit by metal halide spotlights.

Uplights in the concrete pedestals of the gazebo emphasize the wood and copper structure, while two small overhead lights accent special displays. Farther out on the lawn, simple PAR accent lights graze the trunks of windswept coconut palms and illuminate the green canopy overhead.

To culminate the scene, we actually lit the surf. Two 1000-watt narrow-beam metal halide spotlights punch the surf along the breakers where white foam and sea spray provide an ever-changing backdrop. The landscape and seascape lighting heighten a nighttime experience that otherwise would be limited to hearing the crashing surf and the rustling of palm branches in the dark. It allows an expanded use of the client's facilities, while giving guests dramatic memories of their tropical paradise. ■

For product information, turn to page 62 and see Manufacturers.

Attractive, effective lighting from off-the-shelf equipment

Lighting a 90,000-square-foot renovated space for a major U.S. corporation can be a daunting task under the best of conditions, but it becomes an exercise in ingenuity when the timeline is just 10 weeks from issue of construction documents to first move-in. With no time for developing custom fixtures or waiting for shipments of special equipment, lighting designer Alfred Borden IV skillfully combined readily available, off-the-shelf equipment into an attractive, effective lighting design for IBM's new regional marketing services facility.

The facility's training rooms, conference rooms, computer rooms, enclosed and open office spaces, and product display area fill four floors of an existing office building. "Nothing was there that we could reuse," says Borden. "Our project was a complete refit of the building interior." The client wanted a low-glare, high-efficiency lighting system that would deliver 50 footcandles on office work surfaces and 15 footcandles in corridors. Borden used a minimum of fixture and lamp types — all attractive, easily accessible, and priced within the limits of the construction budget — to fulfill these design criteria.

Project: Regional marketing facility
Location: Valley Forge, Pennsylvania
Client: International Business Machines Corp.
Architect: The Kling-Lindquist Partnership, Inc.; Florinda Doelp, IBD, project director; Charlotte Hess, project manager and senior designer; E. Mitchell Swann, P.E., mechanical services engineer; Jack Baldwin, P.E., electrical engineer
Lighting Designer: Alfred R. Borden IV, IALD, The Kling-Lindquist Partnership, Inc.
Photos: Tom Bernard

Susan Degen

Susan Degen is associate editor of Architectural Lighting.

Indirect fluorescent fixtures create a visual link with existing structural columns in open-plan offices. Partition details echo their linearity and curved form. Borden added depth of field by using compact fluorescent downlights and wall washers to light corridors and wall surfaces. Corridor downlights are also circuited for emergency egress lighting. Sconces with luminous vertical faces add a soft glow to exterior walls.

Office Lighting

"IBM wanted to go parabolics throughout," says Borden, "but we thought that an indirect system in the open-office space would be much easier to install and would provide a better lighting environment. We asked IBM to give us a shot at finding a way to do it with indirect lighting." The suspended linear fluorescent fixtures he chose also help control glare on VDTs and enhance the look of the highly textured ceilings.

The building's space plan determined not only the spacing of fixtures but also the type of fixtures that could provide sufficient light levels. Linear fluorescent fixtures with very wide spread distribution patterns are suspended above groupings of built-in work stations that are fixed between columns spaced 20 feet on center. "The only way to make indirect lighting work was to get fixtures that could give us the right light level and uniformity when you spaced them 20 feet on center," says Borden. "To get a really good spread, we had to drop them down pretty low below the ceiling. The ceiling itself is not quite nine feet, and the fixtures are on a 20-inch suspension. You can't walk under them comfortably."

Borden used 39-watt biaxial 3500K fluorescent lamps with a high CRI of 82. "This color has a crispness that enhances the 'businesslike' nature of the space while flattering skin tones and the soft, pastel wall finishes," he says. The lamps are mounted on edge in the fixtures. "The lamp itself has an awful lot of lumens in a tiny package," he adds. "The vertical orientation of the lamp means that most of those lumens are going to either side. The fixture manufacturer sent us some photometrics. We put them into the computer here, and what we came out with was exactly

what we were looking for. It was just amazing."

Cove lighting mounted inside drywall soffits around the capitals of existing columns adds the punch of accent light on vertical surfaces. Standard fluorescent tubes would have worked in the coves, but Borden opted for 3500K biaxial lamps. "When you're trying to work with fluorescent, the toughest thing to maintain is color consistency," he says. "As you move from a biaxial lamp to a straight tube to a U tube, you're working with different voltages and different arc configurations, so you might be generating different colors even if you have the same phosphor."

Reception and Product Display Areas

Incandescent lighting used in the customer service reception area and the product display area gives visitors a warm welcome. In the reception area,

Recessed parabolic troffers light training rooms, computer rooms, and enclosed offices (above). "They maximize headroom under the low ceiling and define the ceiling plane with a regular pattern of low-brightness apertures," says Borden. Recessed MR16 accents highlight computers in a product display area (below) without overpowering images on VDT screens. Dimmer-controlled, cove-mounted incandescent T lamps add a wash of downlight around the perimeter of the room and an uplight accent on the center of the ceiling.

Unlike the office areas, the customer service reception area has incandescent lighting. Downlights from the product display room beyond graze a panel of glass blocks with backlighting. "The idea was to have a translucent panel that added a little sparkle," says Borden. "The glass block wall is interesting, but kind of neutral, too. We wanted to make the architecture a little more festive, but make it stand back so that the products really took the forefront. IBM is not just the machines, it's also the software that runs on them. What catches your eye, the most colorful thing there, is the screens."

recessed downlights illuminate surfaces of the main desk, while wall washers and sconces bring out textures in wall coverings, displayed products, and other elements. A wall with a backlit glass block panel separates the reception area from a display area, where pedestal-mounted microcomputers and other products are on view.

Incandescent lighting for the facility's product display area comes from MR16 accents, portable uplights, and concealed coves with T lamps. Borden used recessed MR16 downlights with 2-inch apertures to add sparkle to computer keyboards without overpowering screen images. On the floor behind each display pedestal, he placed a portable incandescent can, which produces uplight to visually separate the displays from the background. A stepped ceiling soffit around the room's perimeter conceals strips of 24-volt incandescent T lamps. The lamps also add a warm uplight accent to a circular ceiling cove over the middle of the room.

Energy Savings and Cost-Effectiveness

With low-wattage incandescent and biaxial fluorescent lamps, the lighting design is extremely energy efficient. According to Borden, general lighting fixtures in the open and enclosed offices consume only 1.15 watts per square foot; lighting around column capitals and downlights in corridors add 0.5 watts per square foot to the total energy bill. "All sources in the office, training, and support spaces — 90 percent of the project — are long-life fluorescents, operating at 277 volts," he says. "This reduced costs for wiring and relamping and also simplified the emergency power distribution system." Given local utility rates, Borden calculates the payback period to be approximately eight months.

The lighted environment of IBM's Valley Forge facility has both a comfortable feel and a unique look. "IBM places a high priority on the design of its facilities," says Borden. "The company wants to project to their customers and employees a positive image of an energetic company on the leading edge of technology. This facility suits that image. It has a striking appearance and it works. What made the project rewarding is that, given the time span and the constraints of the program, we found a product that would do exactly what needed to be done. When the fixtures were installed, it was beautiful. Everybody loved it." ■

Lighting Graphics

Custom concrete bollard

Sam Mills, AIA, IES

Sam Mills is an architect and lighting consultant with his own firm in Oklahoma City.

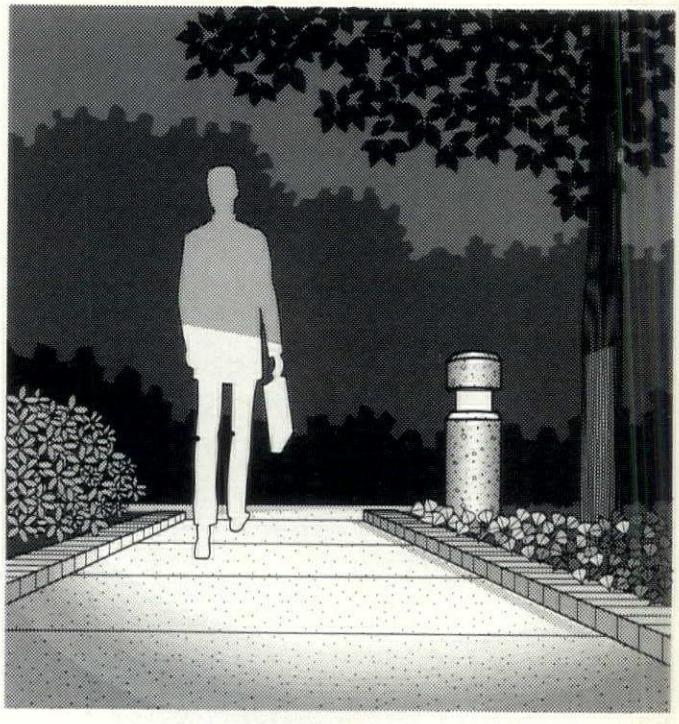
Last month's column featured a custom-designed lighted bollard with a housing made of pressure-treated wood.

Another material appropriate for this use is concrete, which offers excellent durability and maintenance characteristics as well as strong, simple visual appeal.

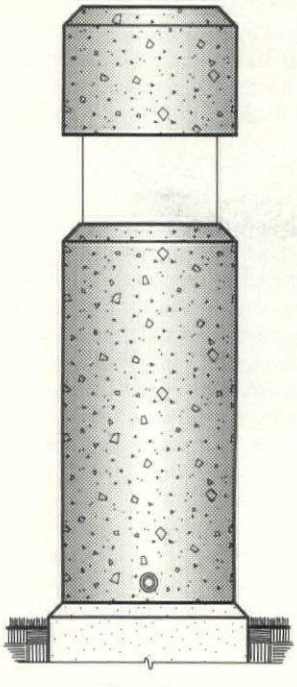
The concrete housing can be formed using relatively simple molds fabricated from ordinary plastic pipe and architectural column forms. It can be molded at the job site or, preferably, off site by a fabricator of specialty precast concrete products. The off-site option, of course, offers more quality control and is particularly important when more than just a few units are involved.

The accompanying drawings show a unit designed for on-site assembly of the components during installation. It could also be assembled off site if access is provided to complete the wiring.

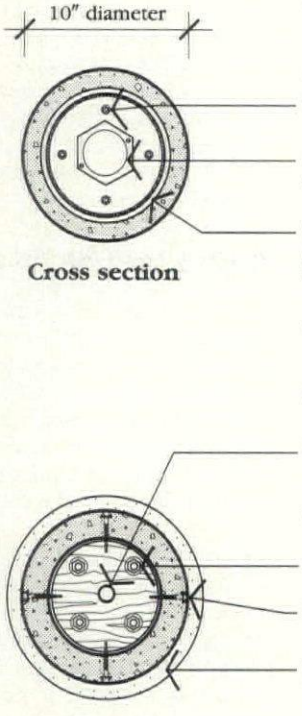
Low-wattage metal halide or high pressure sodium lamps can be an alternate light source if appropriate ballasts are added. ■



Lighted concrete bollards furnish illumination for after-dark circulation and improved security, while offering maximum durability, low maintenance, and strong visual appeal.

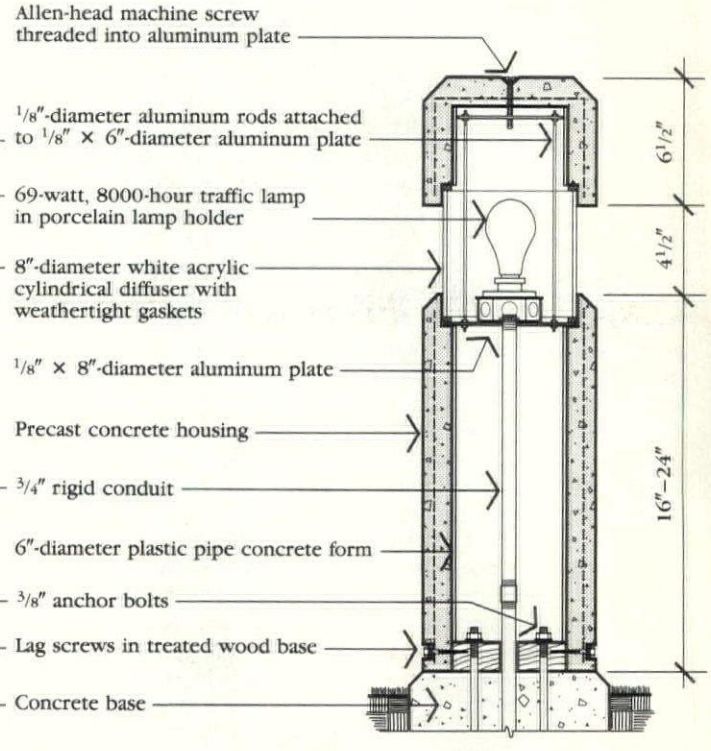


Elevation



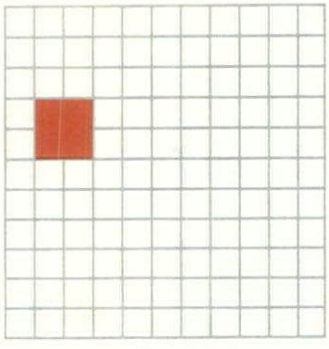
Cross section

Cross section



Section

The Lighting Design Professional



Office lighting for public and support spaces

James R. Benya, PE, IALD

James R. Benya is senior principal and CEO of Luminae Souter, San Francisco. He teaches lighting design classes for the ASID, IBD, IESNA, and American Lighting Association.

Although most of an office building is, of course, devoted to offices, the public is more likely to see other rooms: reception areas, lobbies, boardrooms, conference rooms, and the like. Wisely designed lighting in these areas can make an entire office project look much better for a minimal investment.

General lighting systems for open office areas and typical private offices usually account for the lion's share of lighting in an office building — around 80 percent of the luminaires and at least 70 percent of the energy use and cost. But the "other" spaces play a crucial role in shaping the public perception of the building's quality and value. Because they take up a relatively small percentage of space, it makes excellent economic sense to spruce them up with lighting as well as other architectural or interior design improvements.

Public Image

The first lighting design step for a space of this type is to determine the appropriate public image. That will suggest kinds of lighting equipment that convey particular impressions to a visitor, helping to project the image.

Some law offices, for example, create a comfortable and familiar setting for private clients by using table lamps, chandeliers, and well-designed art lighting for art collections. Corporate headquarters often want to appear comparatively timeless and style-free, which indicates clean, modern architecture and recessed lighting. Entrepreneurial companies may want more stylish designs with contemporary Italian torcheres and pendants that match an equally state-of-the-art interior. And an advertising agency might find track lighting appealing as a means of displaying products or presenting recent client work as art.

Lighting can establish an impression of cost and quality. Companies that want a cost-conscious profile should stick to simple recessed lighting or sheet-metal sconces in public areas. On the other hand, developers can make a multi-tenant office building seem of higher quality by using sconces and recessed downlights in public areas instead of cheap troffers; the extra cost for the improvement will be minimal.

What to Choose

Except in general office and conference areas, recessed troffers usually provide too much light and appear cheap as well. Instead, designers should consider some of the following basic lighting approaches for many spaces.

Downlighting with traditional round downlights is still very acceptable for lobbies, corridors, and other spaces. For initial economy, use incandescent luminaires; for energy efficiency, use compact fluorescent or low-wattage HID downlights.

Mini-troffer downlights now offered in nominal 1-foot by 1-foot shallow fixtures allow up to three 18-watt compact fluorescent lamps in a parabolic look-alike with reasonable efficiency. They make an excellent alternative for lighting private offices and conference rooms, in addition to corridors and lobby areas.

Wall washers with incandescent, halogen, HID, or fluorescent lamps allow for indirect lighting from the walls, art display lighting in lobbies, and presentation lighting in conference rooms. True wall washing requires luminaires to be located some distance away from the wall, and is not suitable for reflective stone walls.

Wall slots with continuous rows of fluorescent lamps brighten upper walls and are very good for interior corridors. Wall slots generally provide poor art lighting, but they are excellent for highlighting a wall with a specular finish, such as polished marble.

Surface and suspended fluorescent and HID luminaires, in addition to being useful in general office lighting, can be used in many ways to light other spaces too. Applications range from general illumination in lobbies and conference rooms to special uses like wall washing and chalkboard lighting.

Recessed and surface-mounted accent lighting using adjustable luminaires or track is an excellent way to provide dramatic impact in a space. PAR and MR lamp fixtures are usually the only choices. Remember that a recessed fixture does not make a style statement of its own, whereas a track or surface-mounted fixture does.

Decorative Essentials

To provide the proper visual cues, decorative or ornamental lighting fixtures are a necessary part of the interior design. To the lighting designer, decorative lighting can be problematic: many attractive luminaires provide glary light or use extremely high-wattage, low-efficacy lamps. A traditional chandelier, for instance, can easily burn 300 watts while providing no more illumination than a single 40-watt fluorescent lamp. Therefore, careful selection is essential.

Decorative luminaires for offices are of three principal types: sconces, pendants, and portable luminaires. Sconces come in many shapes and forms, ranging from inexpensive sheet-metal fixtures to fabulous designs in glass, fine metals, and stone. Many manufacturers make compact fluorescent sconces that are suitable for many office lighting applications. Halogen sconces, meanwhile, offer an attractive source that can be dimmed.

Pendants are primarily designed to be hung over a conference table or desk. Although only a few use compact fluorescent lamps, pendants are very popular because they make a powerful statement of style that is easily changed by hanging another fixture. Torcheres and other portable luminaires have always been favored by the more traditional interior designers for their residential style and feeling.

Energy and Economics

The biggest disappointment on any project happens when the lighting — or any other well-designed portion of the architecture — must be changed to cut costs and meet the overall project budget. A lighting design *formula* can be applied to any office lighting design with a major benefit: it makes lighting costs a priority up front. With the formula, quality and energy trade-offs against cost can be made quickly and intelligently.

One formula for typical lighting in tenant spaces was generated as a result of a recent study for a medium-quality,

Continued on page 40

Book Reviews

The Optical Design of Reflectors, Third Edition, by William B. Elmer. Salem, MA: TLA Lighting Consultants, Inc., 1989. 290 pages.

During his long career in the electric lighting industry, William B. Elmer firmly established his reputation as one of the great "architects" of luminaire design. Now approaching 90 years of age, Elmer has recently produced the third edition of his now classic text, *The Optical Design of Reflectors.* The new edition, like its predecessors, still focuses on the optical design of reflectors that have mirrorlike, or *specular,* surfaces. It's interesting to note that the retrofit specular reflector industry thinks it discovered the benefits of mirrorlike reflectors. Elmer's long career disproves this notion.

The title should not lead readers to believe the book discusses reflector design alone. Elmer considers everything from component selection to maintenance.

It is not widely understood that the design of true high-performance luminaires — those using specular reflectors — involves much more than the routine application of optical design principles. As with architecture, the basic design criteria relate to human needs — ergonomic, aesthetic, and economic — and many elements must be creatively integrated into the final product. Computer programs can aid design, but they cannot invent new concepts.

Elmer's book is about the design of high-performance luminaires rather than the creation of strictly decorative luminaires, which often use mirrorlike elements in experimentally clever ways. The high-performance, ergonomic luminaires discussed in the book are designed to satisfy the needs of human vision for specific visual tasks in interior and outdoor spaces. They also, as Elmer states, "could translate into some startling energy savings, even on a national scale." This is not hype. To date, efforts to save electric lighting energy have focused on the use of high-efficiency lamps and ballasts and the fine-tuning of footcandle criteria. These efforts have saved a lot of energy, but true high-performance, ergonomic luminaires could provide an *additional* 20 to 50 percent savings.

In the design method outlined in the book, a designer first determines visual needs and selects an appropriate lamp. The designer then sets out to develop a complete luminaire, including all auxiliary equipment: a luminaire that will efficiently utilize light from the bare lamp (or lamps) and put it where it will be useful for the task at hand. Elmer's approach and the discussion in the book consider everything, including component selection and placement, manufacturing technique, and maintenance. The title of the book should not lead readers to believe that the book discusses reflector design alone.

Even in 1989, few commercial and industrial luminaires are as sophisticated as Elmer's designs. That is because most luminaire manufacturers are not in the high-performance, ergonomic lighting business. Although some types of exterior and interior luminaires include optically designed specular reflectors, most of the luminaires produced today use diffusing and semispecular reflectors. The main light-controlling elements in such luminaires are refractors and louvers.

Elmer correctly stresses that refractors have many disadvantages as light-controlling elements, compared with properly designed specular reflectors. As he points out, prismatic refractors inevitably lose light through multiple reflections within the refracting medium, and they may waste too much light by sending it in the wrong directions, causing glare and spill. Still, the mystique of refractive light control lives on.

Elmer asserts that a protective light cover (such as clear glass) should never be used over a specular-reflector luminaire unless it is a vaportight or explosionproof fixture. I disagree. Elmer is right in claiming that such covers reduce luminaire efficiency due to unwanted reflections off the top and bottom surfaces, which bounce around inside the luminaire. And it is true that the clear cover is not needed to protect the lamp or reflector with some types of luminaires.

Many types of luminaires do require such covers, however, because their complex specular reflector systems are impossibly difficult to clean. It's simply a matter of maintenance convenience. The cover is a lot easier to clean than the reflector. Imagine a flashlight without a clear plastic "lens"!

Tempered glass covers are an essential safety requirement for certain types of HID light sources. Furthermore, most specular reflector surfaces are not tough enough to be exposed to corrosive atmospheres and the usual abrasive "dirty rag" cleaning. I could introduce a rather long story here about the original Golden Gate Bridge luminaires, which had exposed, and initially specular, reflectors, but the reader can probably guess how it ends.

Elmer also advocates the smooth-contour, continuous-curve reflectors so staunchly that he seems to have ruled out faceted specular reflectors entirely. He dismisses the latter as "laboriously" designed by experimental cut-and-try methods. Admittedly, smooth-contour hydroformed reflectors were promoted as superior during the 1960s and 1970s, and they acquired a mystique similar to that of the prismatic refractors Elmer dislikes so much. Reflectors fabricated from prefinished specular aluminum lighting sheet were then seen as a sure sign that the manufacturer did not have enough money for "proper" hydroform tooling.

Many people think of ergonomic luminaire designers simply as ray-tracing wizards, but calculation is only part of the process. Such designers must also understand manufacturing, components, vision, and human needs.

Actually, the faceted specular reflectors used today are designed by extremely precise procedures that avoid the beam hot spots and striations often created by continuous-curve reflectors. Such beam defects are generally due to slight (and inevitable) deviations from theoretical perfection in the smooth-contour form, lamp uniformity, and lamp-center position.

The current trend in high-performance, ergonomic luminaire design is shifting toward linear and full-shell faceted reflectors that are fabricated from prefinished specular aluminum lighting sheet. In economic terms, faceted specular reflectors require comparatively long

fabrication and assembly times, but the associated expense is no greater than the expense of polishing and anodizing reflectors produced by stretch-forming methods such as spinning and hydroforming. Also, the finishing of spun and hydroformed reflectors after fabrication rarely achieves the mirrorlike quality of prefinished reflector sheet, and then only at very great expense.

When luminaire designers encounter problems like beam hot spots and striations with continuous-curve specular reflectors, they often change to a semispecular or nearly diffuse finish. Elmer has added an interesting new chapter on the design of diffuse reflectors to this third edition of his book, although such reflectors are not optically designed. But there is no need to sacrifice specular finishes to "save" a design. During the 1980s, new thin-film and silver-film-coated superspecular sheet materials were introduced that can significantly increase luminaire efficiency and beam strength. Properly designed faceted reflectors made of highly specular materials can achieve the highest performance level, without hot spots or striations.

Elmer's book is undoubtedly the definitive text on ray tracing. Much of the book is devoted to that subject and to curve generation techniques for developing classic symmetrical reflector shapes: parabolas, ellipses, and simple hybrid forms. Elmer's techniques can, of course, also be used to design faceted mirror reflectors. All students of luminaire design need to learn these basic techniques before they begin to rely on computer programs, although computers perform the painstaking calculations more quickly and accurately.

Fortunately, Elmer tells us a lot about the creative process of conceiving, designing, and developing high-performance, ergonomic luminaires. The ergonomic lighting industry, which is still in its infancy, sorely needs people with Elmer's creative skills. It may be that the lack of a good name for his specialty has caused educational institutions (and students) to overlook this need — a need that this book tries valiantly to satisfy. The term *lighting designer* does not seem appropriate, since few lighting designers specialize in the complete design and development of ergonomic luminaires. Elmer is an illuminating engineer, but most illuminating engineers do application engineering, not luminaire development.

Unfortunately, many people think of ergonomic luminaire designers simply as ray-tracing wizards — an unfortunate image, because calculation is but a part of the process. It is just as important that such designers understand manufacturing, components, vision, and human needs. A simple name is needed for Elmer's specialty to suggest a broad range of skills. I hope that Elmer's next book (finished at age 100?) will teach us more about his creative process.

—John R. Brass

John Brass is president of Lighting Research & Development, Inc., Novato, California.

***The Optical Design of Reflectors*, Third Edition, $32.50**

TLA Lighting Consultants, Inc.
72 Loring Avenue
Salem, MA 01970
(508) 745-6870

Continued from page 38

The layered design approach

In designing public spaces, too much attention is unfortunately paid to the appearance of the luminaires and too little to the quantity or quality of light. Make sure the space is properly lighted by using this five-step approach.

Determine *how much light is needed for tasks.* Typically, 50 footcandles or more is needed for office work, 30 footcandles or more for vertical displays, and 10–20 footcandles for general illumination in corridors and service areas. Don't forget to take room dynamics into account. A presentation space might need separate task lighting for the wall and the conference table.

Determine *how much light is needed on other room surfaces* to create the proper comfort and mood. Very dramatic spaces usually have poor uniformity, high contrast, and many dark surfaces, especially upper walls and ceilings. Very comfortable spaces are often the opposite. Good audiovisual spaces require dark walls and ceiling during presentations.

Choose *decorative luminaires.* Be sure to determine what lighting effect these luminaires will create. Because many decorative luminaires have poor photometric performance, down-lamping (using lamps of lower wattage than the manufacturer recommends) is often a good idea.

Balance the design by discreetly supplementing the decorative luminaires. Add the necessary basic equipment, such as wall washers, downlights, or accent lights, to achieve the required lighting effect.

In multifunction rooms, add a *control system* with well-labeled presets or individual dimmers or switches for each lighting layer.

energy-efficient, high-rise office building in Seattle. Every 1000 square feet was to be allotted the following: ten 2-by-4, three-lamp parabolic troffers with T8 lamps; four 13-watt compact fluorescent sconces, downlights, or wall washers; and one 50-watt MR16 accent light.

This package permits reasonable basic lighting with some frills, yet costs only about $3.00 per square foot (in 1989 dollars) and operates at 1.23 watts per square foot. With the addition of lighting controls, such as occupancy sensors, the equivalent connected power density (as calculated under California Title 24) can approach 0.90 watts per square foot.

The tenant's architect or interior designer thus receives a flexible design package, but with adequate limitations to ensure an energy-efficient design. In the Seattle project, for example, changing the compact fluorescent fixtures to incandescent ones would reduce cost by $0.50 per square foot and increase power density by 0.27 watts per square foot without a perceived change in the quality of the space.

Even on a budget, an effective office lighting design and a happy client can be achieved through the wise use of design possibilities. The most successful recent office lighting projects under Title 24 use these concepts, for they consider energy efficiency to be integral to the process. After providing a good-colored fluorescent lamp for general lighting, the limited and discreet use of higher-quality lighting techniques is the key to designing office spaces that look and feel better for a minimal investment. ■

Product Showcase

Low-voltage light strip

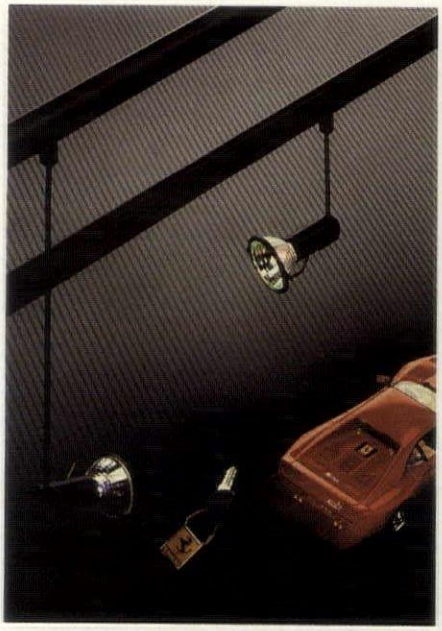
Tokistar's TXL Light Strip is a 1 1/4-inch by 7/8-inch white PVC extrusion fitted with sockets for low-voltage subminiature lamps that can be spaced as close as 1 1/10 inches apart. The system can be specified in wattage levels from 6 to 18 watts per foot. Toki America Technologies, Inc., Anaheim, CA.

Circle 60

Surface-mounted floodlight

Hanover Lantern offers a junction/ballast burial box with an attached floodlight housing for low-wattage HID sources. The unit has heavy-duty cast aluminum components and is suitable for in-ground mounting. It is available in versions for a 50- to 100-watt mercury vapor, 35- to 100-watt HPS, or 70-watt metal halide lamp. A matching model for a 100-watt PAR 38 mercury vapor lamp is available. Hanover Lantern, Hanover, PA.

Circle 63



Miniature track lighting

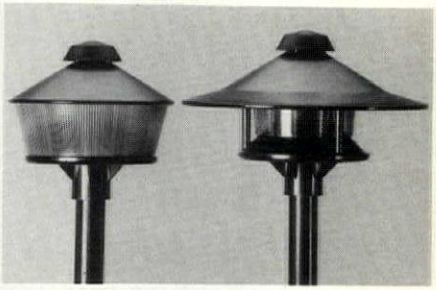
Targetti's Minitondo low-voltage track system comprises miniature spotlight fixtures mounted on a single-circuit track of extruded aluminum and PVC. The track has a maximum load capacity of 32 amperes, can be surface- or suspension-mounted, and operates with an in-line electronic transformer or a ceiling-mounted transformer. The spotlight fixtures come in a variety of styles and accommodate a 50-watt bipin or MR16 halogen lamp. Targetti Inc., New York, NY.

Circle 61

HID area lighting

Holophane's Prismglo luminaire is designed for areas where high-output fluorescent sources are commonly used. It has a heavy-duty die-cast aluminum ballast assembly and a prismatic optical assembly of borosilicate glass. A door at the bottom of the optical assembly facilitates relamping. The luminaire comes in two beam patterns, is UL listed for damp locations, and accommodates an HPS or metal halide lamp up to 400 watts. Holophane, Newark, OH.

Circle 62



Low-voltage walkway lighting

Low-voltage walkway fixtures from Electro-Elf are made of injection-molded polycarbonate, which resists fading, cracking, and breaking. Features include a 12-inch steel stem, a water-shielding prismatic lens, opaque and translucent top caps, a 12-watt lamp, and a polycarbonate ground spike. Models LV4000 and LV1000 feature the Turbo Venturi lamp cooling system for extended lamp life. Electro-Elf, Temple City, CA.

Circle 64

■ Miniature truss system

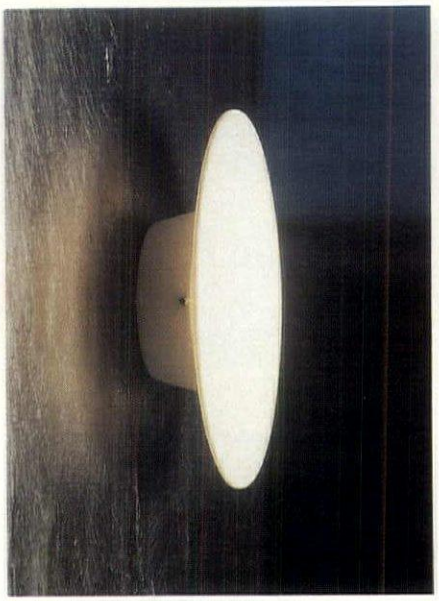
Roxter's Mini Truss lighting system comprises a variety of fixtures mounted on 4-foot lengths of surface-mounted or suspended triangular truss. The truss comes with an end cap for horizontal applications or a baseplate for vertical applications; optional joiners are available. Model 6130, pictured, has two Euro-style fixtures, each with an integral transformer and a 3-inch-diameter housing for a 50-watt MR16 EXT spot lamp. Standard finishes are black and white; chrome and brass are optional. Roxter Mfg. Corp., Long Island City, NY.

Circle 65

■ Flush-mounted luminaire

The Galena flush-mounted ceiling luminaire from Brass Light Gallery reproduces a turn-of-the-century original. It has solid brass construction and features a finely detailed square coffered design. The 8-inch-high luminaire comes with white opal or prismatic glass shades. Two- and three-light models are available; each socket accommodates an incandescent lamp up to 150 watts. Brass Light Gallery, Milwaukee, WI.

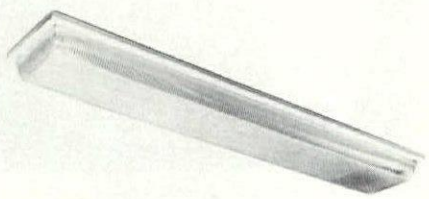
Circle 66



■ Surface-mounted luminaire

The AJ Eklipta from Poulsen Lighting is designed for surface mounting on ceilings or walls. The discus-shaped luminaire of hand-blown homogeneous opaline glass is mounted on an aluminum backplate housing that has a weather-resistant, matte white baked enamel finish. The luminaire is UL listed for wet locations and comes in two sizes. Both sizes accommodate an incandescent or compact fluorescent lamp. Poulsen Lighting Inc., Miami, FL.

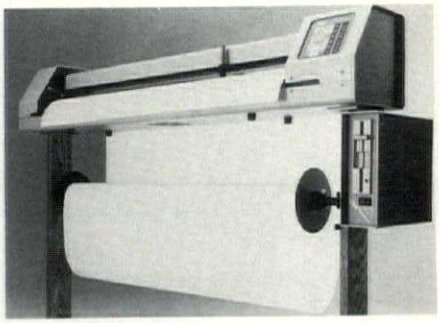
Circle 67



■ Security luminaire

The Series 91 surface-mounted fluorescent luminaire from H.E. Williams is suitable for use in areas subject to vandalism. A polycarbonate diffuser completely encloses the tamper-resistant, low-profile luminaire. One- and two-lamp models are available for trigger start or rapid start lamps. H.E. Williams, Inc., Carthage, MO.

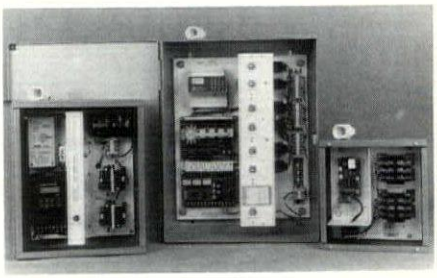
Circle 68



■ Pen plotter

Ioline's LP4000 pen plotter accepts any size of bond, vellum, double-matte mylar, or acetate film from $1\frac{1}{2}$-inch-square sheets to 37-inch-wide continuous roll stock. It stores users' customized plot parameters in a nonvolatile memory, uses nonproprietary plotting pens, and is compatible with many personal computer systems. Accessories include a multiple pen changer, a buffer, a file server, and a roll-feed system (shown) that advances and aligns plotting media before each plot. Ioline Corp., Kirkland, WA.

Circle 69

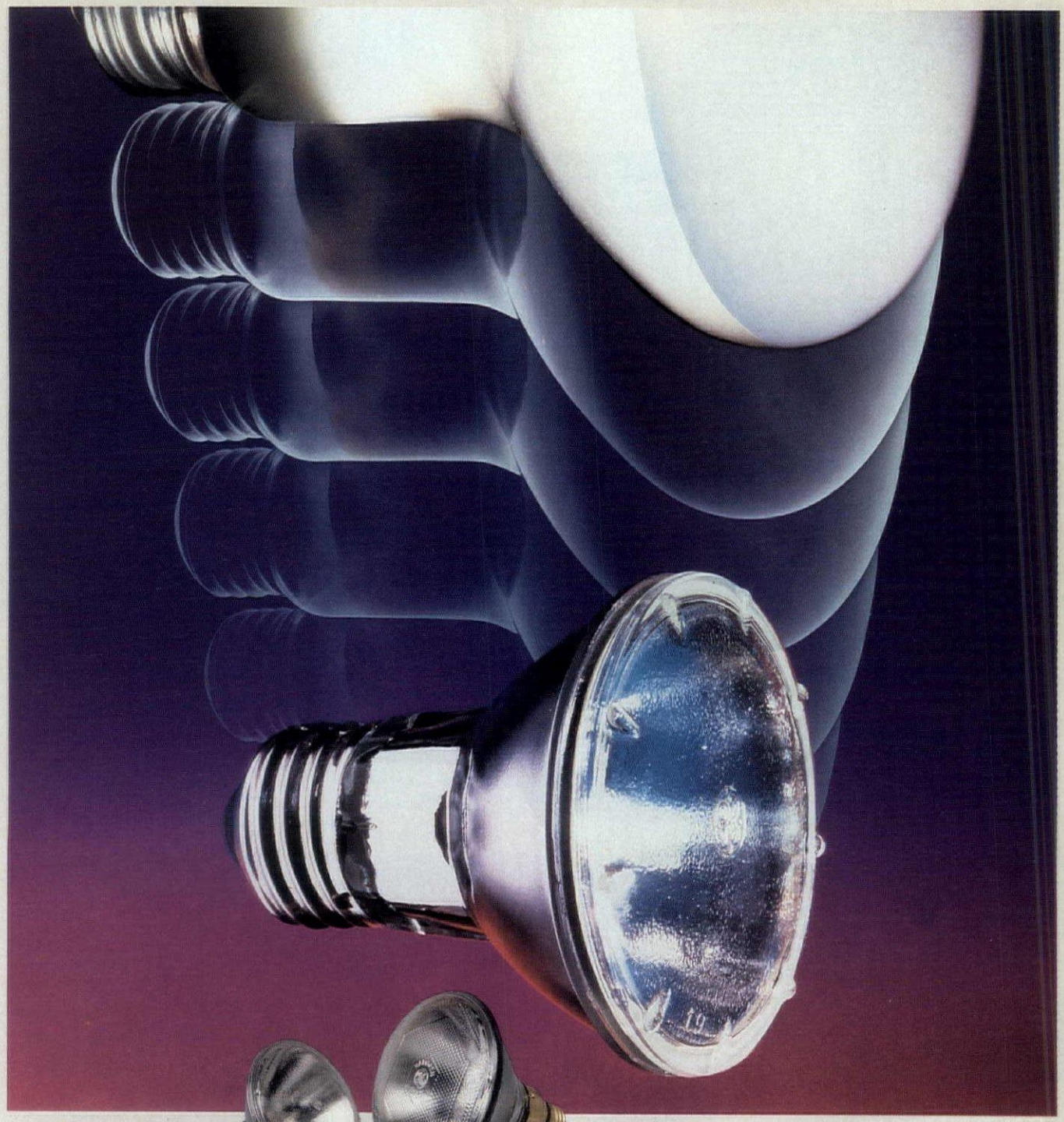


■ Photocell controls

Multipoint's Galaxy control system combines photocell and time-control units in self-contained switching packages for regulating both inside and outside lighting. The photocell is mounted outside the control panel and uses low-voltage power; its user-adjustable on-off range is 0–500 footcandles. The control system can be custom ordered for assembly with a variety of components. Multipoint Control Systems, Inc., Everett, WA.

Circle 70

GE Is The Light That Delivers Bigger Lighting Punch From A Smaller Lamp.



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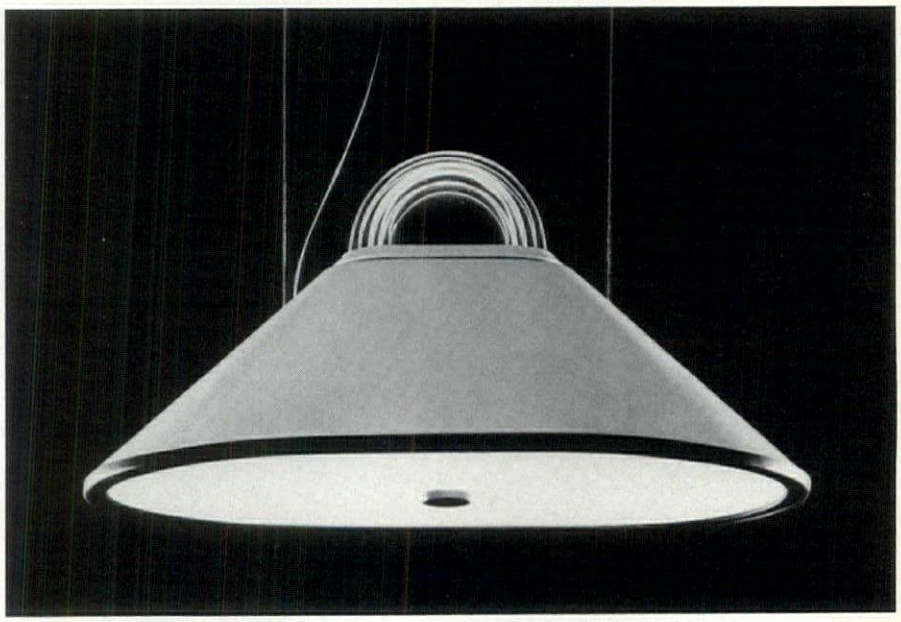
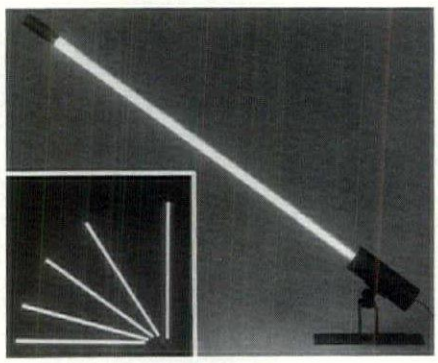
Circle 16



■ Pendant

Lightolier's Palazzo pendant has stacked ovals of Palazzo glass that extend up from an oval-shaped metal shade. The shade has a black gasket outlining its lower edge and a bottom glass diffuser that produces even, glare-free downlight. Steel cables support the 18-inch-diameter pendant, which accepts two 75-watt incandescent lamps. Matching wall brackets and flush ceiling versions are available. Lightolier, Secaucus, NJ.

Circle 71



■ Portable neon

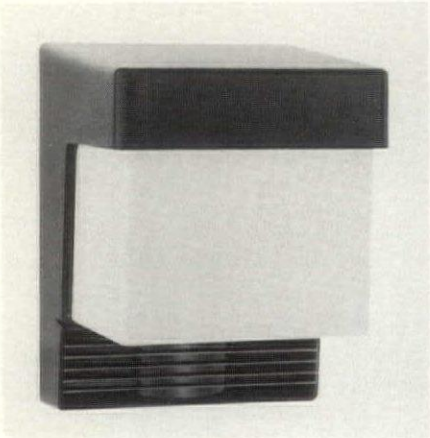
Data Display Systems offers Neon Strokes, a decorative 4-foot neon light stick that comes in five colors and can be mounted easily on ceilings, walls, or floors. The lightweight unit has electronic circuitry, a protective tube cover, a dimmer control, an on/off switch, and a 20-foot line cord. It can be plugged into standard outlets and has internal stabilizers that allow it to be transported safely. Marketing agent: Diamond/Marcus, Huntingdon Valley, PA.

Circle 72

■ Task luminaire

Chiaro International offers chrome task luminaires with brass accent rings. They come in two sizes — a small model measuring 13 inches high and a large model measuring 21 inches high. Both accept A lamps up to 100 watts. Chiaro International, New York, NY.

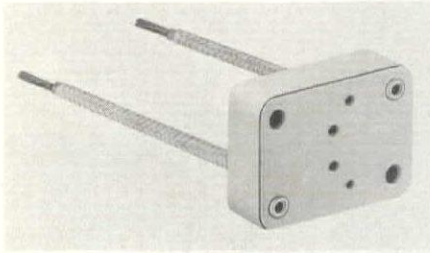
Circle 73



■ Motion-activated fixture

The SmartPack belongs to RAB's LightAlert line of motion-activated exterior fixtures. A passive infrared sensor in the fixture turns on the light when it detects movement within a 50-foot radius. Other fixture styles in the series include floodlights, Colonial lanterns, and a contemporary sphere. RAB Electric Manufacturing, Inc., Northvale, NJ.

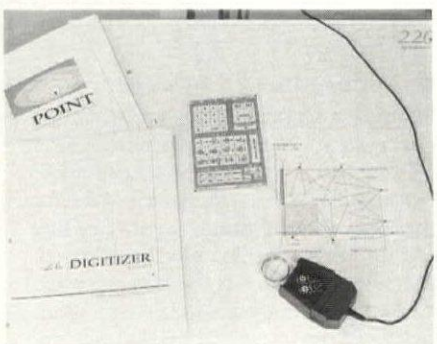
Circle 74



■ Halogen lamp holder

Leecraft's Series QLB-B halogen lamp holders are suitable for applications where high light output and precise filament location are crucial. The UL-listed units accommodate bipin-base halogen lamps. Performance is rated at 300 volts maximum, 750 watts. The lamp holders have ceramic housings, stainless steel contacts, and mica cover plates. Standard lengths of the SF-1 lead wires are 6 and 12 inches. Leecraft Manufacturing Co., Inc., Long Island City, NY.

Circle 75



■ Digitizer software interface

Lighting Analysts offers a digitizer software interface for use with the Point illuminance-calculating program. The device processes coordinate data from electrical signals or sound images, eliminating the need to scale and enter coordinate data manually. It operates with any modern digitizer tablet and can reduce the time spent on the input of project-related parameters by up to 90 percent, according to the company. Lighting Analysts, Inc. Littleton, CO.

Circle 76

■ Decorative indirect luminaire

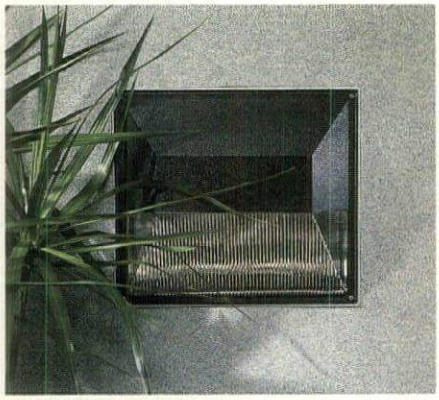
SPI's Renaissance line includes a triple-cluster luminaire that is suitable for high-ceilinged spaces. Available in a variety of translucent and opaque finishes, the luminaire's three acrylic domes are each attached to a steel trim ring and held in place with spring hooks. The luminaire comes in versions for metal halide, HPS, or compact fluorescent lamps. Matching double- and quad-cluster configurations are available. SPI Lighting, Mequon, WI.

Circle 77

■ Table lamp

Adjustable Fixture's Nightingale table lamp is part of the Brass 'n Color series. Engineered for rugged use and low maintenance in institutional settings, the lamp comes with a solid brass base and trim, a nonremovable harp, an easy-access paddle switch, a heavy-duty three-prong plug, and an unbreakable, fire-resistant shade. Its pedestal has a baked enamel finish available in a variety of colors. Adjustable Fixture Co., Milwaukee, WI.

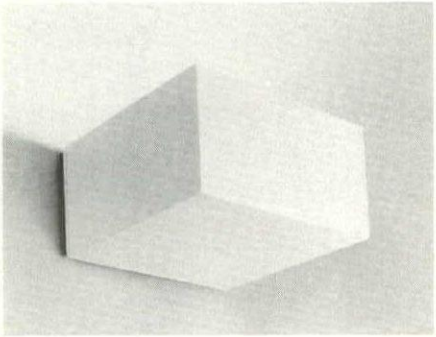
Circle 80



■ Recessed floodlight

Lithonia's KLD series recessed floodlight has a lamp socket that can be fully adjusted on site during installation. The floodlight has a one-piece, UV-stabilized polycarbonate lens and a cast aluminum housing. It comes in a choice of three finishes and is available in versions for an incandescent or HID lamp. Lithonia Lighting, Conyers, GA.

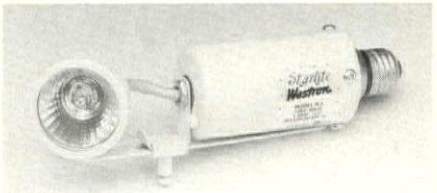
Circle 78



■ Wall-mounted uplight

Elliptipar's Ensconce self-contained compact uplight can be concealed in an architectural space or housed in a decorative enclosure. It has an asymmetric reflector that projects light evenly across a ceiling surface, even at ceiling heights as low as $8\frac{1}{2}$ feet, according to the manufacturer. Various models accommodate a tungsten halogen lamp or a metal halide lamp with a remote or integral ballast. Elliptipar Inc., West Haven, CT.

Circle 79



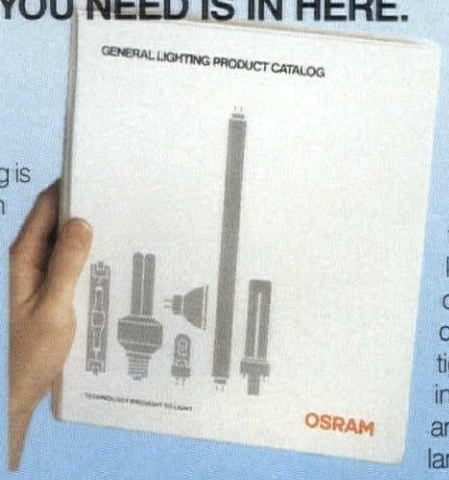
■ Retrofit MR16 assembly

Westron's Starlite MR16 lamp assembly is designed for retrofitting in incandescent high-hat and track fixtures at least $2\frac{1}{2}$ inches in diameter. A telescoping arm allows it to adapt to the depths of most high-hat fixtures. The unit has a fully adjustable lamp head that can be aimed in any direction. Westron Corporation, New York, NY.

Circle 81

ILLUMINATING READING.

IF YOUR DESIGNS REQUIRE LIGHT, EVERYTHING YOU NEED IS IN HERE.



The OSRAM General Lighting Catalog is a thorough source of information on every one of our energy saving lamps for general, task and accent lighting.

It features complete specifications for each lamp, including luminance, efficiency and dimensions—and detailed schematics too.

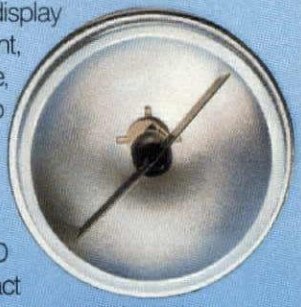
In the guide you'll learn more about:

BI-PIN Lamps: Bi-Pin tungsten-halogen incandescent low voltage lamps offer a high luminous efficacy of up to 25 lm/W—for concentrated light in a sturdy, compact package. They are available in both axial and transverse filament construction to accommodate a wide range of reflector designs. They are the perfect fit to light small spaces and burn in any position, and have a lifespan of more than 2000 hours. The Bi-Pin is suitable for wall decorations as a working or supplementary light, for small showcases, and for highlighting in store windows, museums and galleries.

HQI Lamps: HQI metal halide lamps offer a high luminous efficacy and the highest level of CRI available. Their long life, high lumen output and low heat radiation make them the right choice for

indoor lighting systems in showrooms, store windows, trade shows, hotels and restaurants—any place where high quality and economical operation are a requirement.

PAR-36 Lamps: A unique aluminum reflector is responsible for the tungsten halogen PAR-36 lamp's light weight and antiglare characteristics. It offers excellent color rendition, a 2000 hour life and tight beam control. Applications include: display and accent, landscape, track and downlighting, disco and spot lighting.



DULUX® D Compact Fluorescents: DULUX D is a single-ended compact fluorescent that lasts more than 10 times longer, and consumes up to 75% less energy than a comparable incandescent, while providing the same light output. The DULUX D combines quality of light, excellent color and a high lumen package, making it suitable for small, unconventional fixtures, shallow downlights and modern lighting systems. The DULUX D is available in 2700 K, 3500 K and 4100 K color temperatures, and in standard and dimmable versions.

OSRAM lamps have a reputation as the standard that others follow. If you're the kind of designer who likes to lead the way, you should make them your standard. Whether you're lighting a space, or designing a new fixture, we'll work with you to make it better than you would ever imagine.

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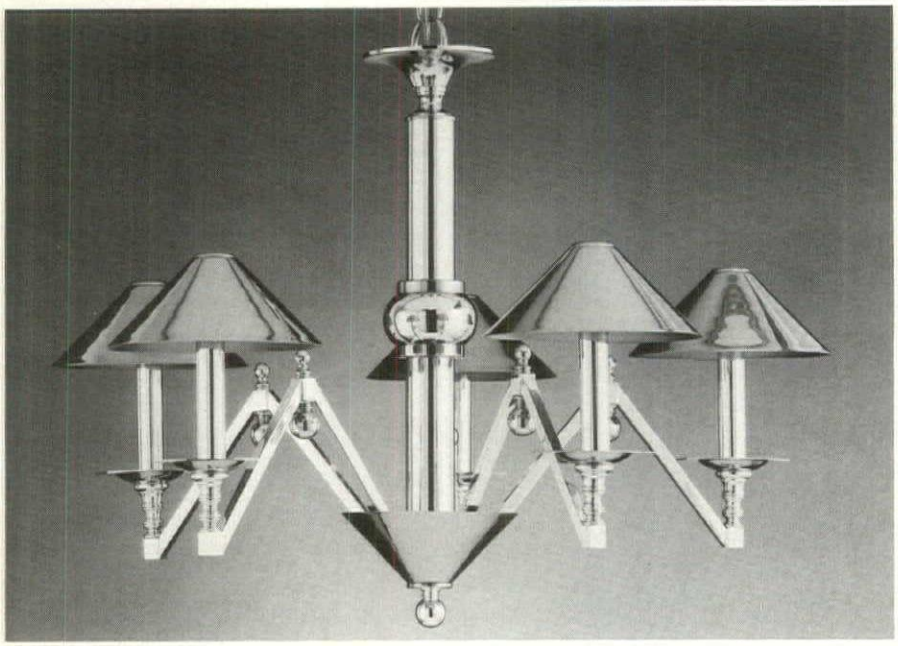
TECHNOLOGY BROUGHT TO LIGHT

OSRAM

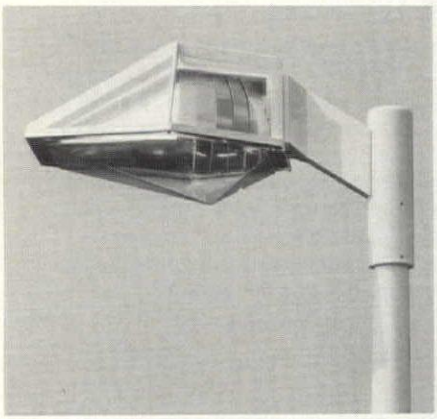
Circle 27



■ Solid brass pendant

LuminArt's Ziggurat solid brass pendants and matching sconces come in two finishes: polished brass with polished black chrome accents and polished chrome with polished brass accents. Pictured is model 1305, which accepts five 60-watt incandescent lamps. Polished brass shades are optional. LuminArt, Canoga Park, CA.

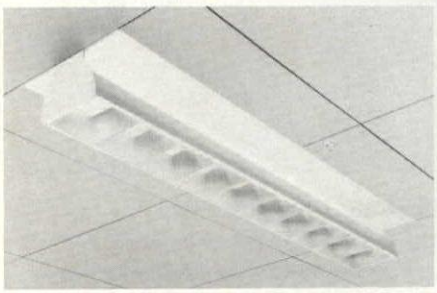
Circle 82



■ Slotted site light

Narrow vertical slots in the reflector of Staff's Polygon site light allow slivers of light to escape, highlighting the fixture's unusual shape. The one-piece, die-cast aluminum frame holds a fully gasketed assembly of upper and lower clear polycarbonate lenses. The specular, faceted asymmetric reflector distributes light from an HID lamp. Double hinges allow easy access to the lamp and ballast compartments. Fixtures, poles, and mounting brackets all have a polyurethane finish. Staff Lighting, Highland, NY.

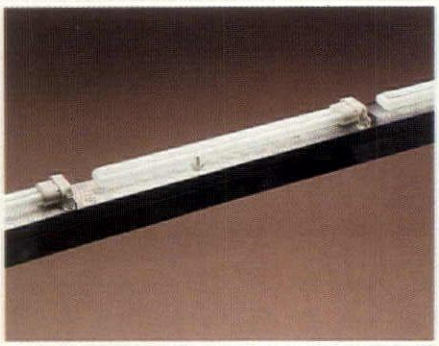
Circle 83



■ Semirecessed fluorescent

The semirecessed ID-DF double focus luminaire from Zumtobel is designed for spaces with ceiling heights of less than 9 feet. A white reflector above the lamp compartment and the segmented exterior of the lamp compartment itself reflect indirect light down into the space. A matte silver parabolic louver distributes direct light onto work surfaces. The 1-by-4-foot luminaire fits most conventional ceiling systems and accepts T8 and compact fluorescent lamps. Zumtobel Lighting Inc., Garfield, NJ.

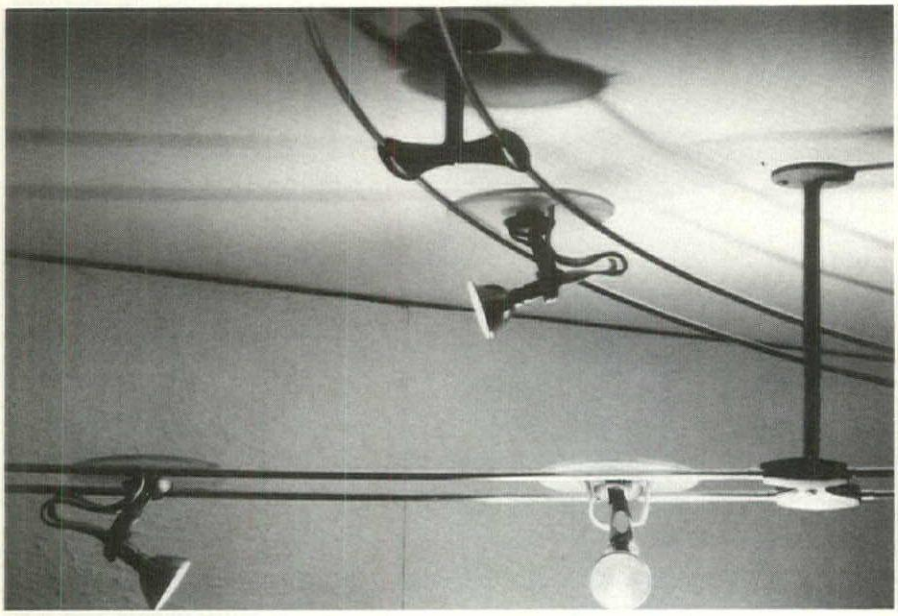
Circle 84



■ Compact fluorescent strips

Model 2850 compact fluorescent light strips from Norbert Belfer Lighting can be ordered in custom lengths as well as in factory-mitered runs. The strips' extruded aluminum raceway houses rapid start, high power factor ballasts and sockets that lift up for easy relamping. The light strips have a satin aluminum finish and can be combined in continuous runs. Dimming ballasts are available. Norbert Belfer Lighting, Ocean, NJ.

Circle 85



■ Low-voltage track system

Butler-Radice's Nostromo low-voltage track system consists of parallel, rail-like tracks that can be curved to fit an interior space. The system's disk-shaped fixtures can be moved easily along the tracks and can accept a variety of low-voltage lamps. The system has chrome-plated, domed transformer housings and cast aluminum mounting units that come in several lengths. U.S. distributor: Beachdog, Malibu, CA.

Circle 88

■ Custom lighting

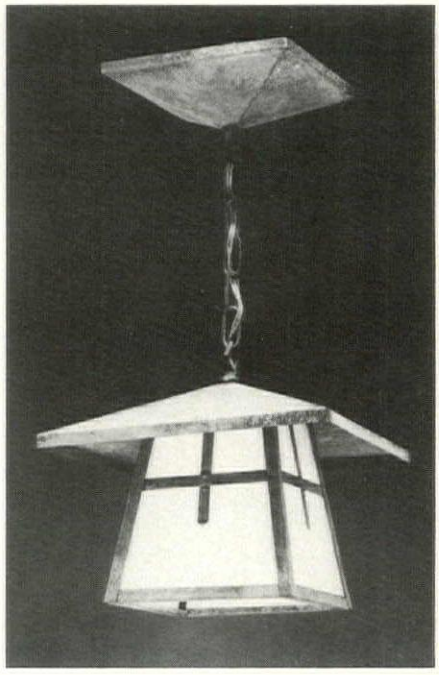
Appleton Lamplighter fabricates custom luminaires to customers' specifications. The chandelier shown was designed by Bill Chin of Green Hiltscher Shapiro, Ltd., for the renovated Watertower Place in Chicago. It features two 6-foot-diameter octagonal rings of mirror-polished stainless steel. The rings surround an octagonal diffuser of frosted laminated glass, which is held in place by a one-piece, laser-cut bronze grillwork. The chandelier accommodates eight 60-watt incandescent A lamps and a 500-watt PAR 64 lamp for downlighting. Appleton Lamplighter, Appleton, WI.

Circle 86

■ Light meter

Watt Watcher's FX-100 digital-analog light meter is a self-contained, easy-to-operate device that displays light levels in footcandles and lux. It can measure nighttime light levels as low as 0.1 footcandle and outdoor daylight levels up to 5000 footcandles. Features include a liquid crystal display, analog output, selenium photovoltaic cells, and automatic zero adjustment. The light meter provides accuracy within 5 percent at a sampling time of 0.4 second, according to the manufacturer. Watt Watcher, Santa Clara, CA.

Circle 87



■ Solid brass lantern

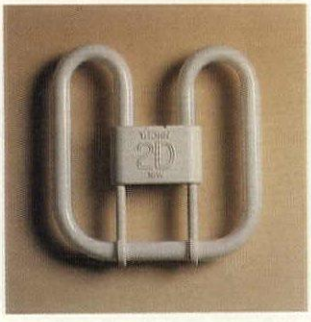
The Craftsman-style Hawthorne lantern from Rejuvenation Lamp & Fixture is made of solid brass in a style reminiscent of early 20th-century porch lights. The 17-inch-diameter, 21-inch-long lantern comes in a variety of metal finishes, including the verde antique finish shown. Art glass lantern shades are available in four colors. Rejuvenation Lamp & Fixture Company, Portland, OR.

Circle 89

With a little imagination.

It offers you a whole lot more.

Thorn Lighting's compact fluorescent *2D* lamp is new in the US today – and it could pay you well to use it with a little imagination. Its unique flat profile and universal burning position create major opportunities for excitingly stylish new designs, or even for imaginative conversions of your current lighting fixtures.

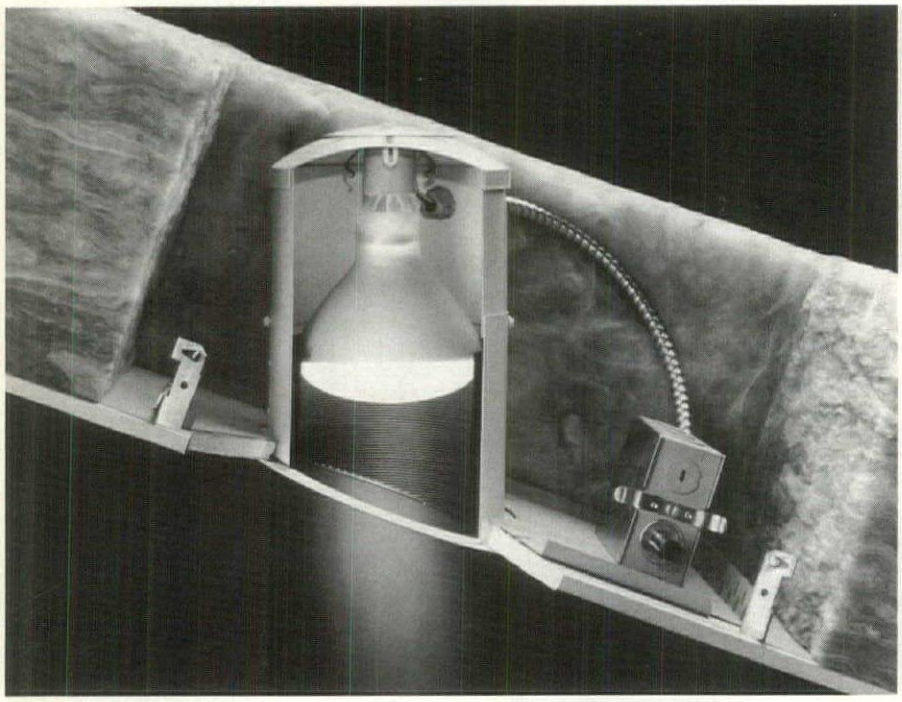


Make no mistake, the *2D* lamp is going to open a lot of new doors for lighting designers. It's cool to the touch so you can get in close with fabrics; the light spread is uniform; it lasts five times longer than an incandescent lamp and uses fully 80% less energy too. So just imagine what you can offer prospective customers now.

To help you find out just what *you* can do with *2D*, write for further information, a special manufacturer's 2D kit, and details on currently available U.L. listed fixtures free on request and let your imagination get the better of you.

Ian Allan, THORN Lighting Ltd., 284 Southbury Road, Enfield, Middlesex EN1 1TJ, ENGLAND.

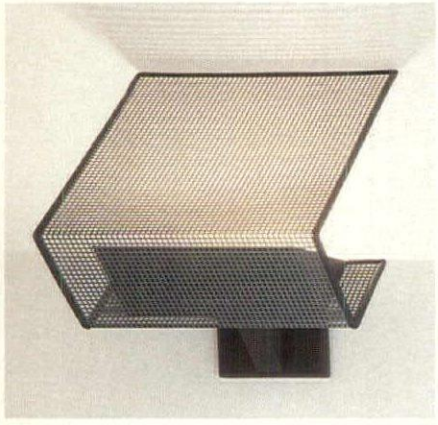
THORN



■ Sloped-ceiling downlight

Halo Lighting offers adjustable downlights for 9- to 27-degree sloped ceilings. They have an adjustable socket plate that moves in two directions, allowing the lamp to be aimed straight down. The model H47ICT shown has a double housing of heat-dissipating aluminum that can be covered by insulation. The model H47T is designed for installations with shallow ceilings. Both models have integral thermal protectors and adjustable bar hangers that span spaces up to 24 inches between ceiling joists. Versions are available for MR16, R40, PAR 38, and A21 lamps. Halo Lighting, Elk Grove Village, IL.

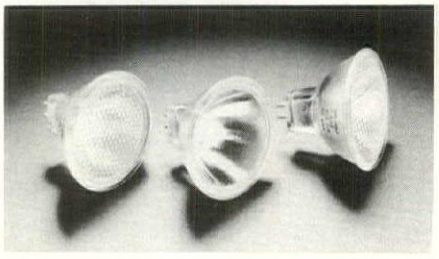
Circle 92



■ Decorative sconce

The Eras sconce is from Winona Lighting's Perf Light series of six decorative luminaires that have perforated metal as a central design element. The 10-inch-wide sconce projects 7 inches from the wall; its metal shade has 1/8-inch square perforations. It is finished in black Nextel and accepts a 150-watt halogen miniature candelabra (minican) lamp. Winona Lighting, Winona, MN.

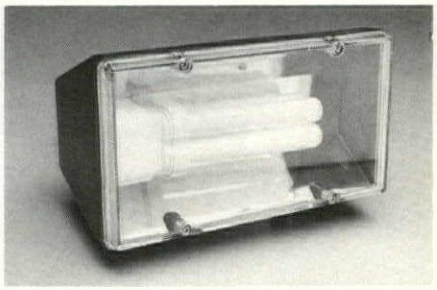
Circle 90



■ Lensed MR16 lamps

Bonded lenses on Sylvania Tru-Aim Plus MR16 lamps offer improved beam pattern, increased reliability, and easier handling compared to standard MR16s, according to the manufacturer. With the lens as an integral part of the optical system, beam control can be more precise than it is when only the reflector shape controls light distribution. The lens also protects the quartz capsule and dichroic reflector from being damaged by human touch or dust buildup. The 12-volt lamps are available in two wattages and three beam patterns; they have an average rated life of 4000 hours. GTE/Sylvania, Danvers, MA.

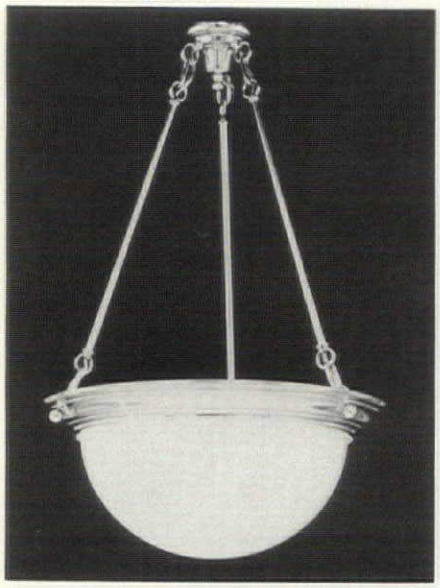
Circle 91



■ Fluorescent floodlight

The Double Bright fluorescent floodlight from Enertron Technologies is brighter and more durable than the standard 150-watt PAR floodlight it is designed to replace, according to the manufacturer. The vandal- and weather-resistant unit has a Lexan housing and lens and produces an 18-foot, 180-degree beam from a 22-watt quad-tube compact fluorescent lamp with a screw-in adapter. It is designed for wet locations and has a reinforced neck for extra durability. Enertron Technologies, Anaheim, CA.

Circle 93



■ Copper and brass luminaire

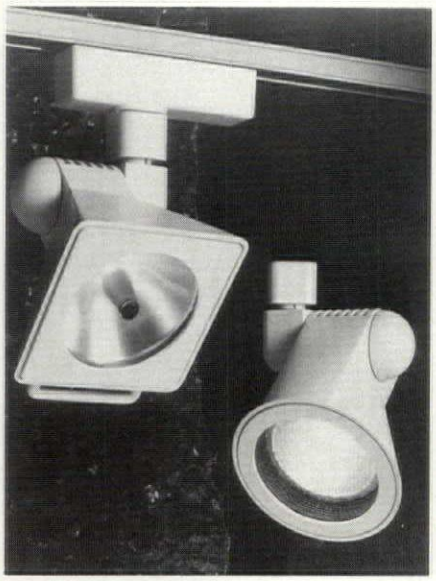
The Original Cast collection from Art Directions includes the Stellar luminaire, which has a copper-finished rim and canopy, brass stems and finials, and an acrylic diffuser. The luminaire is available in three sizes and finishes and accepts 100-watt A lamps. Art Directions Inc., St. Louis, MO.

Circle 94

■ Wall-mounted luminaire

The compact Wallmount 175 from GE Lighting Systems provides short, noncutoff, Type IV distribution for area lighting. Features include die-cast aluminum front and back housings, a hinged front for easy access to ballast and lamp, a prismatic glass lens, and a snap-in anodized aluminum reflector. The unit accommodates horizontal-mounting low-wattage high pressure sodium and metal halide lamps. GE Lighting Systems, Hendersonville, NC.

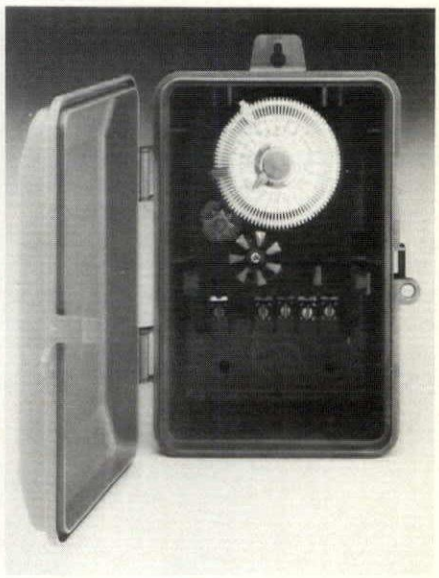
Circle 95



■ Accent fixtures

The Pyramid and Cone fixtures from Capri Lighting are available with an accessory that permits adjusting their beams in a range from 6 to 22 degrees, for precise lighting of objects. Models are available for both 75-watt low-voltage tungsten halogen lamps and 75-watt line-voltage PAR 30 lamps. Available colors are black and white. Capri Lighting, Los Angeles, CA.

Circle 96



■ Time control

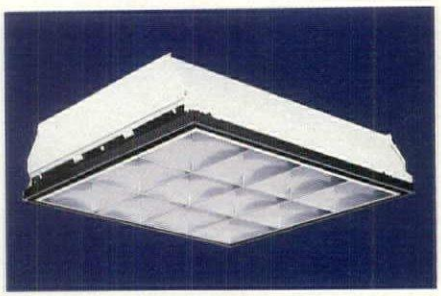
Paragon's P100 Series time control is designed for both indoor and outdoor use. Because its parts are molded from thermoplastic and polyester resins, it can withstand environments where metal timers rust. Its programming allows up to 24 switching events per day. A range of models are available with various electrical specifications and enclosure types. Paragon Electric Company, Inc., Two Rivers, WI.

Circle 97

Cedar lamp pole

Ryther-Purdy's Woodlands lamp pole is crafted of solid or laminated western red cedar and has chamfered corners that give it a tapered look. The straight, square shaft comes in heights up to 40 feet and widths from 4 to 12 inches and can be combined with the company's custom-made guide rail fences. It can accommodate top- or side-mounted fixtures as well as arm mounts from other manufacturers. Ryther-Purdy Lumber Company, Inc., Old Saybrook, CT.

Circle 98



Glare-controlling luminaire

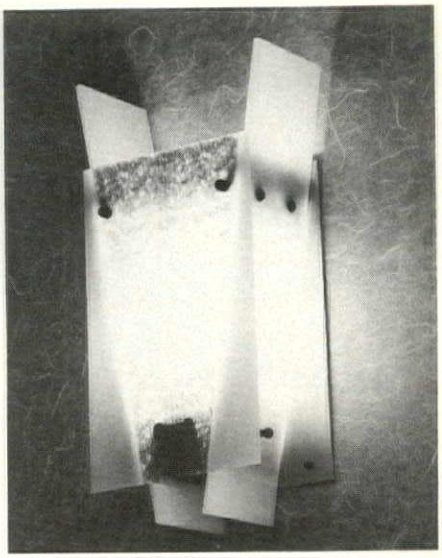
Lithonia Lighting's 2-foot-square Optimax recessed parabolic fluorescent luminaire is designed to help eliminate glare on computer screens. It has a specular aluminum louver that directs light away from glare-producing angles and comes in versions for 40-watt compact fluorescent or 31-watt T8 U lamps. A standard 2-by-4-foot version is available. Lithonia Lighting, Conyers, GA.

Circle 99

Crystal chandelier

A Strass crystal chandelier from Crystorama's Gatsby Collection is made of solid brass plated in 24-karat gold. The two-tier chandelier measures 32 inches in diameter and accommodates 12 incandescent lamps. A three-tier version, two single-tier versions, and a matching bracket are available. Crystorama Inc., Carle Place, NY.

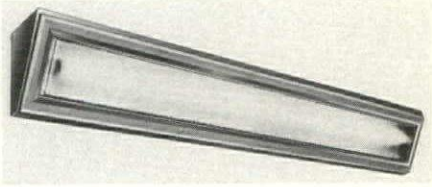
Circle 100



Decorative sconce

Marc Nugent designed the Luminous Spirits sconce from Future Classics. It has sandblasted glass side panels that swivel open for relamping and screens on the panel backs that provide lamp shielding. The sconce's back plate and glass supports are made of brushed, anodized aluminum. It comes in four versions, each with a different side panel configuration. Future Classics, New York, NY.

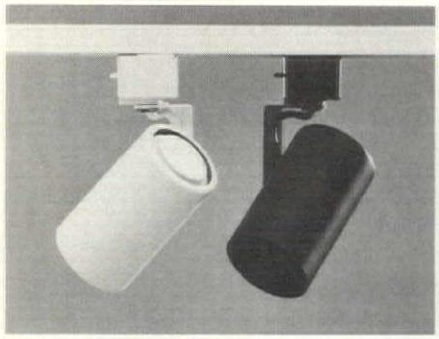
Circle 101



Vandal-resistant fixture

Designplan International's Tuscan vandal-resistant lighting fixture is constructed of heavy-gauge, zinc-coated steel and finished in chemical- and abrasion-resistant PVC. A mastic compound provides a waterproof seal between the polycarbonate diffuser and the diffuser's extruded aluminum frame. The fixture can be used in wet locations. U.S. distributor: R.K. Marketing Inc., Clinton, NJ.

Circle 102



■ PAR 16 track fixtures

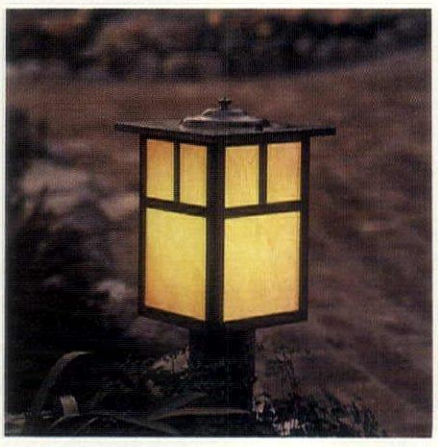
Lightolier's Minispot track fixtures are designed specifically for PAR 16 halogen lamps. The miniature 4 1/2-inch-long, 2 1/2-inch-diameter fixtures accommodate lamps in narrow spot and narrow flood beam patterns. Lightolier, Secaucus, NJ.

Circle 103

■ Pendant luminaire

The CP1314 pendant from Visa Lighting has a 22-inch-diameter, 5-inch-deep bowl that comes in a variety of painted and metallic finishes. A brass accent ring encircles the bowl; a painted ring is available with metallic-finished versions. Versions are available for halogen and fluorescent lamps. Visa Lighting Company, Milwaukee, WI.

Circle 104



■ Garden lantern

The Mission post-mounted lantern from Arroyo Craftsman is made of solid brass and has a verdigris patina finish. It is available in 5-, 6-, and 7-inch sizes with a choice of four glass colors. Matching hanging and flush wall-mounted versions and an optional brass post are available. Arroyo Craftsman, Duarte, CA. ■

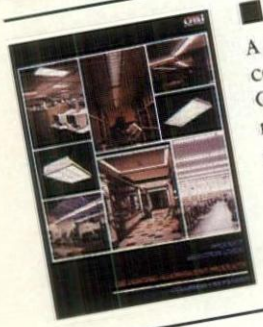
Circle 105

Product Literature

MR16 landscape lighting

Hydrel's low-voltage 4518 series well light and 4524 series uplight/tree light are designed to accept MR16 lamps. An illustrated brochure describes features and accessories for both models. Hydrel, Sylmar, CA.

Circle 120



Fluorescent lighting

A 106-page color catalog illustrates fluorescent fixtures and accessories, including Columbia Lighting's Parabolume luminaires. The catalog details lensed troffers, surface-mounted wall and ceiling fixtures, wet-location fixtures, and specialty lighting units. USI Lighting Inc., Spokane, WA.

Circle 121

Lowering devices

Suspension contact units from Lowering Systems are used to raise and lower luminaires in high, hard-to-reach locations. A color brochure discusses features of two models. Lowering Systems Inc., Northbrook, IL.

Circle 122

Two-circuit track

Con-Tech Lighting's two-circuit track doubles the capacity of a single run of track, according to the manufacturer. A data sheet describes operation and features. Con-Tech Lighting, Deerfield, IL.

Circle 123

Electronic ballasts

Ultra-Miser solid-state electronic ballasts use up to 60 percent less energy than do standard core-and-coil ballast and lamp systems, according to the manufacturer. A brochure discusses benefits. Valmont Electric, Danville, IL.

Circle 124

Pendant, sconce

A color brochure features the Softshine 33-inch-diameter indirect pendant and the 15-inch-diameter sconce, both designed for compact fluorescent lamps. The luminaires come in a variety of colors and finishes. Peerless Lighting Corporation, Berkeley, CA.

Circle 125

VDT task lighting

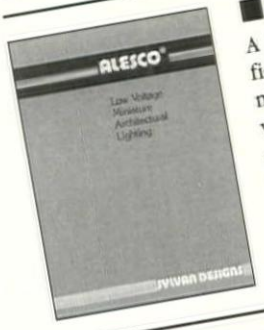
A brochure describes Cad-Lite louvered task lights for areas where VDTs are used. The task light eliminates stray light that can cause reflected glare and hot spots. Waldmann Lighting Co., Wheeling, IL.

Circle 126

Decorative outdoor lighting

A 12-page color catalog illustrates American Lantern's decorative outdoor post-, wall-, and pendant-mounted luminaires. The luminaires accept incandescent lamps and come in a variety of finishes and sizes; many have all-brass construction. American Lantern Company, Newport, AR.

Circle 127



Low-voltage fixtures

A 34-page illustrated catalog provides specifications for Alesco miniature surface-mounted, semirecessed, and recessed low-voltage fixtures. It includes lamp data and recommendations for installation. Sylvan Designs, Inc., Northridge, CA.

Circle 128

Fluorescent floodlights

Kelsey-Kane Lighting's fluorescent flo
lights have durable, weatherproof PV
housings and come in single- and mu
lamp versions for several compact fl
cent sources. A brochure lists featur
accessories. Kelsey-Kane Lighting M
turing Co., Fort Lauderdale, FL.

Circle 129

■ Electronic fluorescent

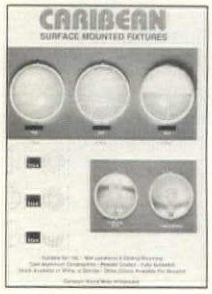
The Dulux EL electronic compact fluorescent lamp is a self-contained unit with a built-in electronic ballast and a screw-in base. A brochure describes features, lists projected energy savings, and shows models with and without reflectors. Osram Corporation, Montgomery, NY.

Circle 130

■ Outdoor enclosures

Hennessy's UL-listed outdoor enclosures protect electronic equipment from vandalism and harsh environments. An illustrated 24-page catalog lists construction specifications, features, sizes, mounting accessories, and hardware. Hennessy Products, Inc., Chambersburg, PA.

Circle 131



■ Wet-location fixtures

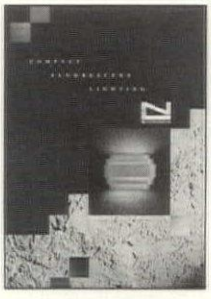
A data sheet details surface-mounted cast aluminum fixtures suitable for use in wet locations. It lists dimensions, colors, and lamp requirements and shows grill and visor accessories. Caribean World-Wide Wholesaler, Miami, FL.

Circle 132

■ Brass luminaires

A 12-page color brochure illustrates solid brass luminaires in seven styles. It includes chandeliers, sconces, pendants, ceiling- and wall-mounted luminaires, and a post-mounted lantern. Kichler Lighting, Cleveland, OH.

Circle 133



■ Compact fluorescent fixtures

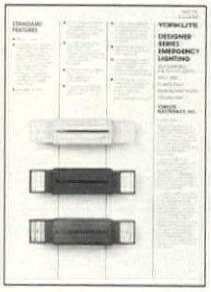
A brochure details recessed downlights and wall washers as well as sconces and surface-, pendant-, and bracket-mounted fixtures that are all designed to accommodate compact fluorescent lamps. NL Corporation, Cleveland, OH.

Circle 134

■ Crystal chandeliers

Olde World crystal chandeliers are designed with Swarovski Strass lead crystal trimmings and with glass arms and scrolls. A brochure contains dimensions, lamp requirements, and color photos of six models. Schonbek Worldwide Lighting Inc., Plattsburgh, NY.

Circle 135



■ Emergency lighting

Designer Series emergency lights come in 6- and 12-volt models. A brochure details standard features, installation, ordering information, and options for wall- and ceiling-mounted units, remote lamp heads, and a power pack. York-Lite Electronics, Austin, TX.

Circle 136

■ Fluorescent fixtures

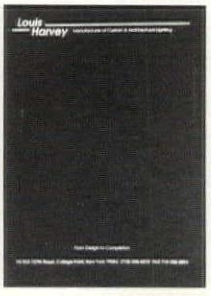
Brodwax Lighting offers a variety of decorative luminaires for straight, circular, and U-shaped fluorescent lamps. A 24-page color catalog illustrates 22 styles, including models with oak or walnut frames. Brodwax Lighting Corp., Island Park, NY.

Circle 137

■ Step lighting

A brochure describes low-voltage interior and exterior step lighting systems, which can provide 5 or 10 footcandles of continuous light from a concealed source in lengths up to 20 feet. Roberts Step-Lite Systems, Inc., Oklahoma City, OK.

Circle 138



■ Custom luminaires

Louis Harvey designs and manufactures custom luminaires to clients' specifications. A catalog illustrates both custom and standard luminaires, including tubular luminaires, floor lamps, chandeliers, and sconces. Louis Harvey, College Point, NY. ■

Circle 139

Calendar

October 16–18, 1989 — **Electrical contractors conference,** GE Lighting Institute, Cleveland. Contact: Richard Janis, GE Lighting Institute, Nela Park, Cleveland, OH 44112, (800) 255-1200.

October 18–20, 1989 — **Outdoor lighting decision workshop,** GE Lighting Institute, Cleveland. Contact: Richard Janis, GE Lighting Institute, Nela Park, Cleveland, OH 44112, (800) 255-1200.

October 19, 1989 — **Interactions of lighting design from conception to installation,** IES event, Academy of Sciences, Golden Gate Park, San Francisco. Contact: Patty Finley, IES Golden Gate Section, 650 7th St., San Francisco, CA 94107, (415) 495-7711.

October 23–24, 1989 — **Light sources — characteristics and applications,** seminar, Howard Johnson Hotel, Cambridge, MA. Contact: TLA–Lighting Consultants, Inc., 72 Loring Ave., Salem, MA 01970, (508) 745-6870.

October 23–25, 1989 — **Light and color for human performance,** seminar, Georgia Tech, Atlanta. Impact of lighting on behavior, physics of light, physiology of human vision, and lighting calculations. Contact: Education Extension, Georgia Institute of Technology, Atlanta, GA 30332-0385, (404) 894-2547.

October 23–25, 1989 — **Architectural lighting: Basics for design and application,** seminar, Keller Conference Center, State College, PA. Includes photometrics and field measurement. Contact: Donna Ricketts, 409 Keller Conference Center, The Pennsylvania State University, University Park, PA 16802, (814) 863-1743.

October 23–27, 1989 — **Industrial-commercial lighting design workshop,** Philips Lighting Center, Somerset, NJ. Contact: Sherry Bachman, Lighting Center Coordinator, Philips Lighting Company, 200 Franklin Square Dr., Somerset, NJ 08875-6800, (201) 563-3600.

November 6–8, 1989 — **Store lighting conference,** GE Lighting Institute, Cleveland. Contact: Richard Janis, GE Lighting Institute, Nela Park, Cleveland, OH 44112, (800) 255-1200.

November 8–10, 1989 — **Lighting conference on hotel, motel, and conference facilities,** Philips Lighting Center, Somerset, NJ. Contact: Sherry Bachman, Lighting Center Coordinator, Philips Lighting Company, 200 Franklin Square Dr., Somerset, NJ 08875-6800, (201) 563-3600.

November 10, 1989 — **1989 IALD awards dinner,** Parker Meridien Hotel, New York City. Contact: Marion Greene, International Association of Lighting Designers, 18 East 16th St., Suite 208, New York, NY 10003, (212) 206-1281, FAX (212) 206-1327.

November 13–15, 1989 — **Office lighting conference,** GE Lighting Institute, Cleveland. Contact: Richard Janis, GE Lighting Institute, Nela Park, Cleveland, OH 44112, (800) 255-1200.

November 15–17, 1989 — **Lighting maintenance contractors conference,** GE Lighting Institute, Cleveland. Contact: Richard Janis, GE Lighting Institute, Nela Park, Cleveland, OH 44112, (800) 255-1200.

November 16, 1989 — **Tour of museum lighting displays,** joint DLF-IES meeting, Academy of Sciences, Golden Gate Park, San Francisco. Contact: Rolph Erickson, IES Golden Gate Section, 650 7th St., San Francisco, CA 94107, (415) 626-1950.

November 16–17, 1989 — **Light sources for luminaire representatives,** course, Philips Lighting Center, Somerset, NJ. Light source technology from basics to lamp and luminaire combinations. Contact: Sherry Bachman, Lighting Center Coordinator, Philips Lighting Company, 200 Franklin Square Dr., Somerset, NJ 08875-6800, (201) 563-3600.

November 18, 1989 — **Color and light/neon and cold cathode,** IES workshop, San Francisco. Instructors: Hy Kaplan, Patty Glasow. Contact: Heide Kawahata, IES Golden Gate Section, 650 7th St., San Francisco, CA 94107, (415) 982-9832.

November 28–December 1, 1989 — **Fundamentals of commercial and industrial lighting,** conference, GE Lighting Institute, Cleveland. Contact: Richard Janis, GE Lighting Institute, Nela Park, Cleveland, OH 44112, (800) 255-1200. ■

Classified Directory

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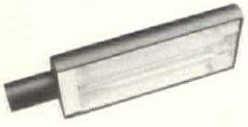
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Peerless: Linear fluorescent indirect pendant uplights.

Photographers

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Daniel Eifert, Daniel Eifert Photography, 26 Second Avenue, New York, NY 10003, (212) 473-2562

John David Fleck, Saks Productions, Inc., 9257 Castlegate Drive, Indianapolis, IN 46256, (317) 849-7723

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