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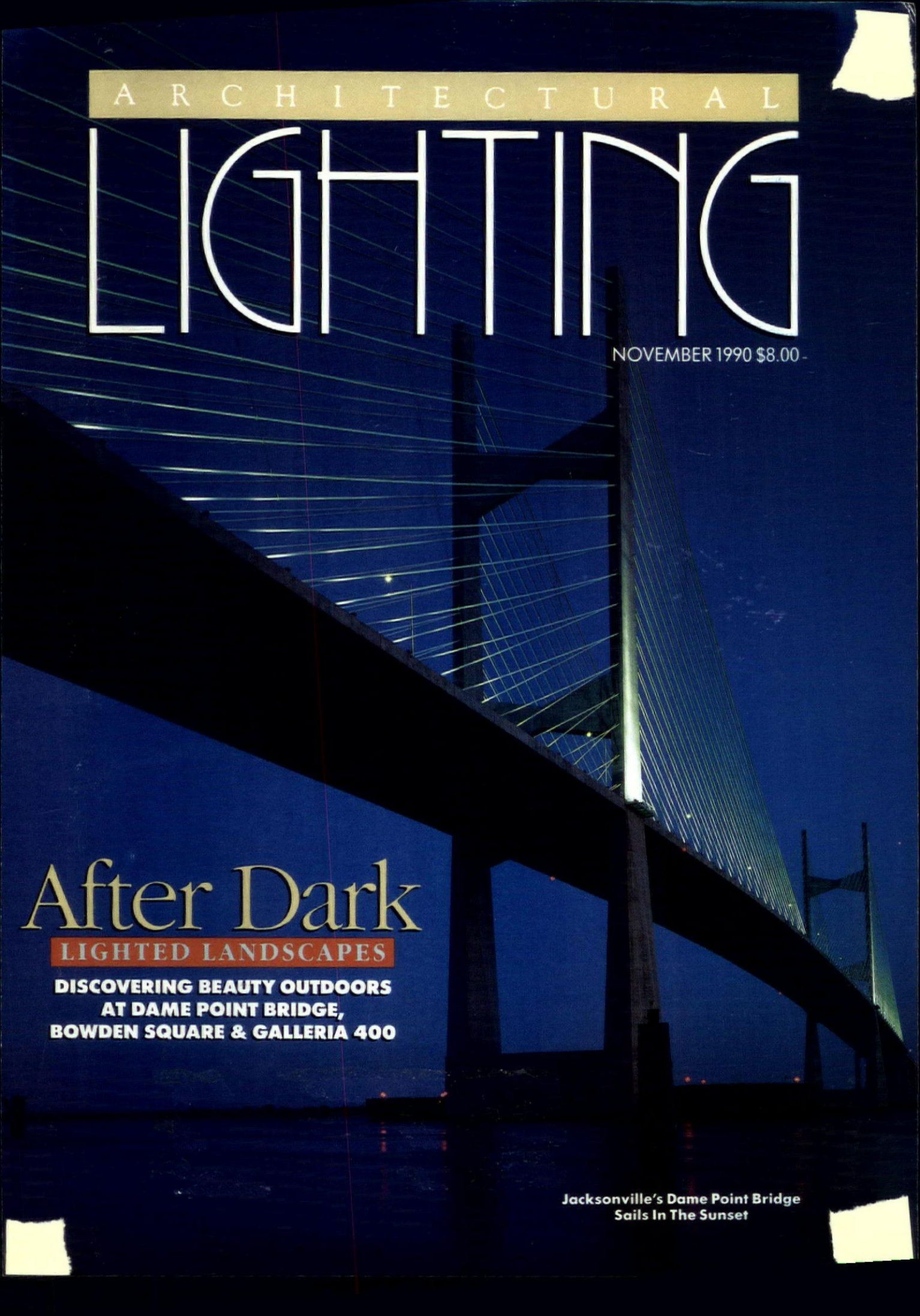

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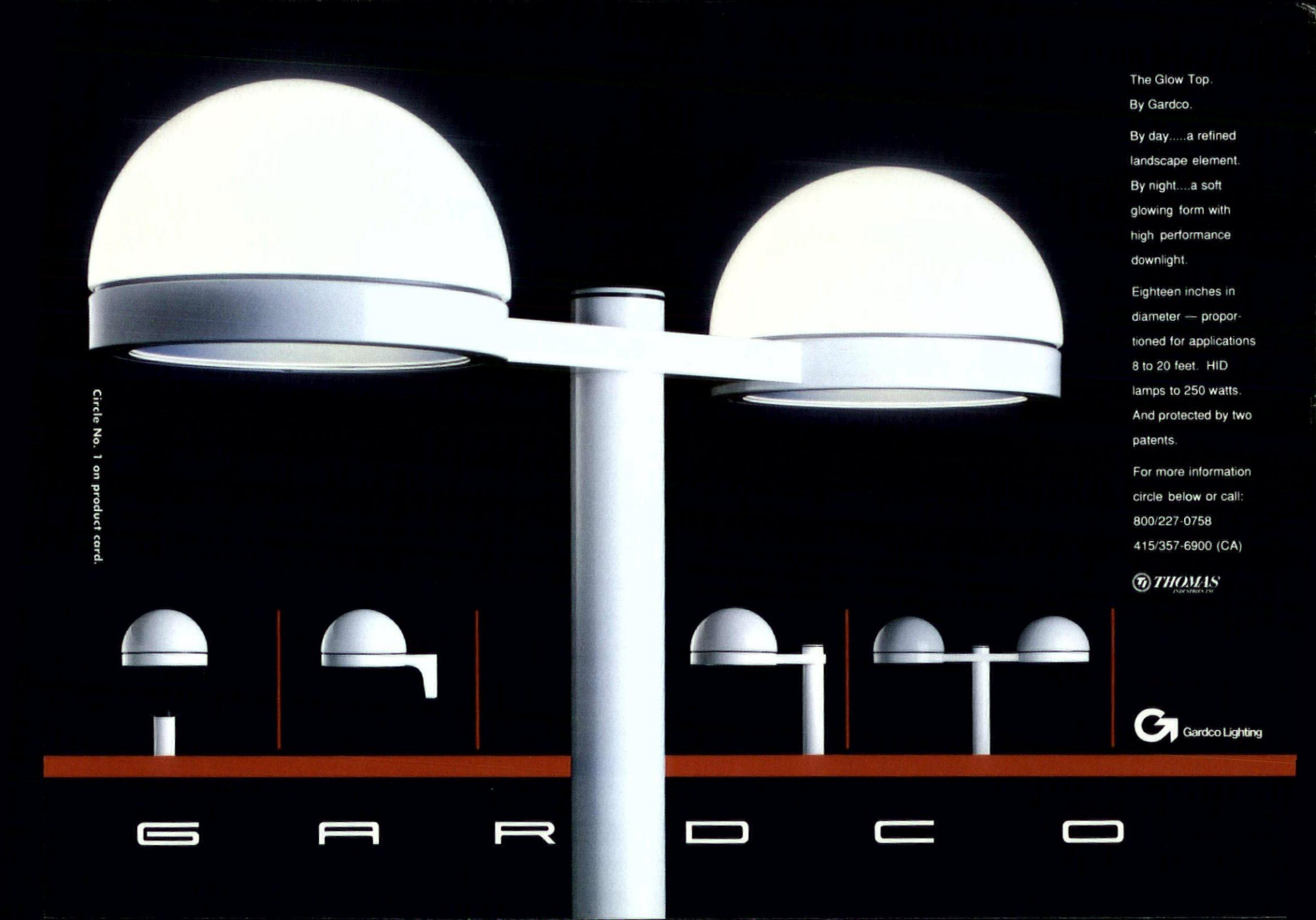
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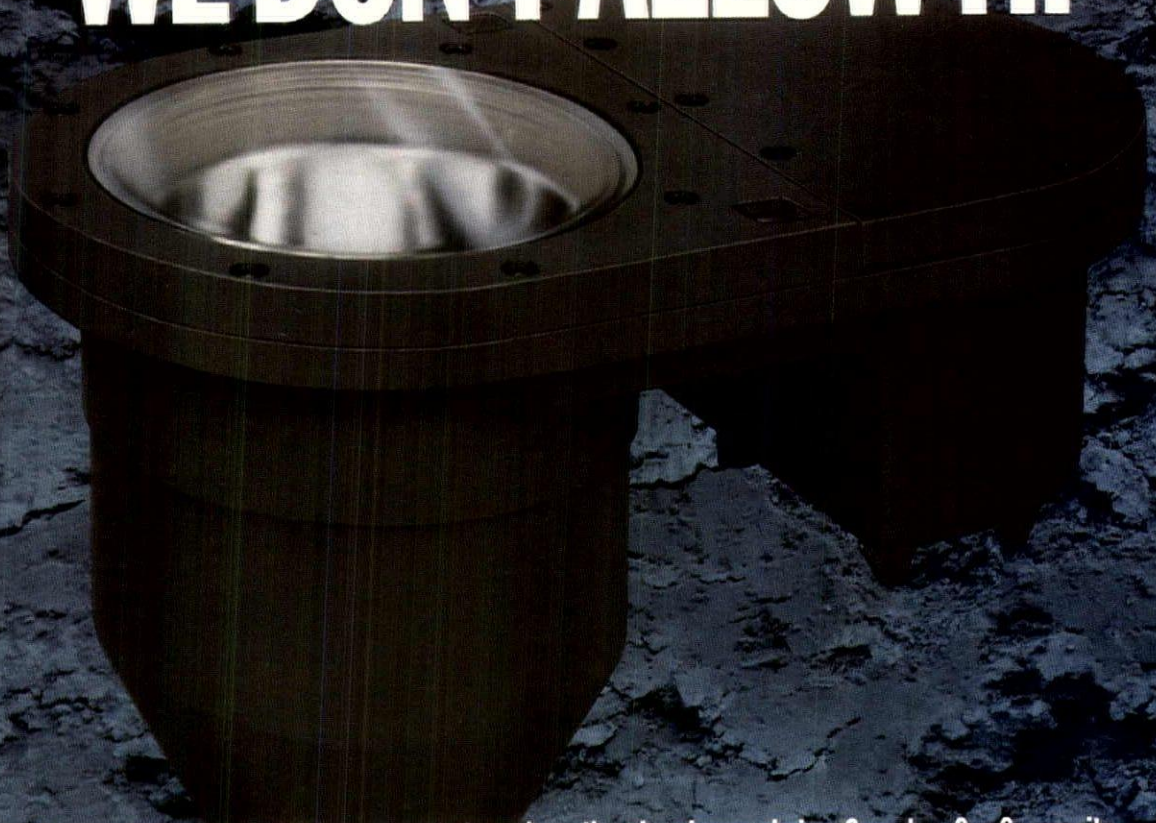

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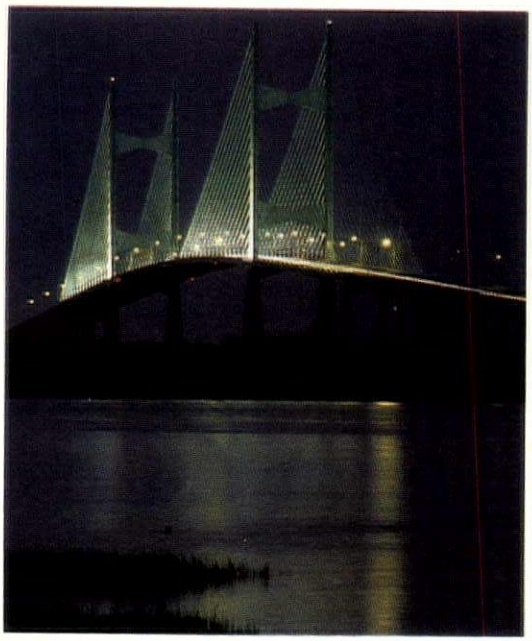
LIGHTING

NOVEMBER 1990
VOLUME 4, NUMBER 11



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ARCHITECTURAL LIGHTING (ISSN 0894-0436) is published monthly by Gralla Publications, a member of United Newspapers Group, 1515 Broadway, New York, NY 10036. Phone (212) 869-1300. **Subscriptions:** U.S. and possessions—1 year (12 issues) $54; 2 years (24 issues) $86. Canadian—1 year $97; 2 years $167. Other foreign—1 year $125; 2 years $215. Single copy price: U.S.—$8 plus postage; outside the U.S.—$10 plus postage. **Subscription Information and Address Changes:** Write to ARCHITECTURAL LIGHTING, Circulation Dept., 1515 Broadway, New York, NY 10036. Allow 4 to 6 weeks for change of address; provide old mailing label and new address, including ZIP or postal code. **POSTMASTER:** Send address changes to ARCHITECTURAL LIGHTING, Circulation Dept., 1515 Broadway, New York, NY 10036. Second class postage paid at New York, New York and additional mailing offices.

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BPA

EDITORIAL

Some Things Shouldn't Change

The age of electronic product catalogs is here. One company has announced that a full-scale launch of its computer catalog program will be undertaken early in 1991. The computer catalog will contain text, remarkable color photos, diagrams, and test and research data. Not only will these electronic catalogs replace a fair amount of printed literature in the future, they will help transform how the business of lighting is carried out.

The only danger is to forget that the purpose of these machines is not to "speed up" the process of design—the thinking through in a human mind of how light affects people and objects and space. The point is to lessen time spent on the drudgery of technical and administrative details.

Light will always be a visual medium best experienced and experimented with hands-on. Here's a reminder that some things shouldn't change from H. Vandervoort Walsh, School of Architecture, Columbia University, who wrote the following in an essay entitled, "An Architect's Reaction To The New Movement In Lighting" in 1930:

> *The most fascinating thing in the world to the architect is the play of light upon surfaces. No light alone holds his attention, but light reflected back from beautiful forms. How light is made is not so absorbing a problem to him as how light reveals things to the eye; how it grades from dazzling brightness to shadows full of color.*

HORN BLOWING

Architectural Lighting has received an Ozzie Award for Design Excellence from MAGAZINE DESIGN & PRODUCTION. Out of 1,300 entries in the awards program, *Architectural Lighting* has been chosen for an Honorable Mention in the category of Best Redesign of a Trade Magazine.

Kudos to our Art Director, Ronald M. Gabriel, whose creativity, refined vision, and careful attention to detail earned him this recognition from a judging panel of award-winning and respected publication designers.

WANDA JANKOWSKI
EDITOR-IN-CHIEF

Last Chance to Bring Your Best Work Forward

DECEMBER 4, 1990, is the deadline for submissions to the International Association of Lighting Designers (IALD) 1991 Lighting Awards Program, established to honor outstanding lighting design.

The judging panel includes: Neil Frankel, AIA, Perkins & Will; Bruce Fowle, AIA, Fox & Fowle; Karen Daroff, Daroff Design Inc.; Raymond Grenald, FIALD, Grenald Associates, Ltd.; Jules G. Horton, FIALD, Horton Lees Lighting Design; Diana Juul, IALD, Steven Mesh/Diana Juul Lighting Design; and Richard Renfro, IALD, Jules Fisher & Paul Marantz, Inc.

The program's Awards of Excellence and Citations will be presented at the IALD dinner, which is co-sponsored by *Architectural Lighting*, on March 6, 1991, during LightFair International in Chicago.

WHO CAN SUBMIT

Submission of an entry is not restricted to IALD members.

WHAT TO SUBMIT

The project must be a permanent architectural lighting design solution, interior or exterior, for which construction was completed since June 1, 1988. Lighting products, equipment, and designs for theatrical performances are not eligible.

HOW TO SUBMIT

Entry materials must be in an 8.5 × 11 inch format, free from designer or firm identification.

- Registration form must be included (see *Architectural Lighting*, July 1990 issue, pages 19-20, or September 1990 issue, pages 45-46).
- Written statement—on blank paper; no letterhead, please—should not exceed one page. It should sum up the architectural and lighting design concept, design criteria, special energy constraints, and solution.
- Submit a maximum of 10 35mm slides for each project. Originals or high-quality duplicates are required. It is recommended any essential plans or drawings be included as slides.

WHERE TO SUBMIT

Contact: IALD, 18 East 16 Street, Suite 208, New York, NY 10003-3193, Tel.: (212) 206-1281, FAX: 212-206-1327. ■

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NOVEMBER 28 DLF Program: "Lighting Solutions for the Aging Eye." G.E. Auditorium, New York City; (201) 392-3818.

DECEMBER 3-5 Industrial Lighting. GE Lighting Institute, Cleveland; (800) 255-1200.

DECEMBER 10-14 Lighting Design & Applications workshop. The Lighting Center, Philips Lighting Co., Somerset, NJ; (201) 563-3600.

JANUARY 17 IES Program—Golden Gate Section: New Light Sources and Applications. Swiss Louis Restaurant, Pier 39, San Francisco; (415) 486-5863.

JANUARY 9, 16, 23 IES—Golden Gate Section Lighting Education classes: "The Lessons of Theatrical Lighting: Creating Space & Moods with Light." San Francisco, (415) 974-6001.

JANUARY 19 IES Golden Gate Section Lighting workshop: Electrical Systems for Lighting. San Francisco, (415) 974-6001.

JANUARY 23 DLF Program: "Energy Code: New York State." (201) 392-3818.

JANUARY 30 IES—Golden Gate Section Lighting Education classes: Residential Lighting. San Francisco; (415) 974-6001.

FEBRUARY 20 DLF Program: Product Fair. (201) 392-3818.

Conferences & Expositions

DECEMBER 1-4 NADI 97th Market. Passenger Ship Terminal, Piers 90 & 92, New York; (212)213-2662.

MARCH 5-7 LightFair, International Exposition and Conference. The Merchandise Mart, Chicago, (404) 220-2115. ■

CORRECTION

September 1990 issue, "Communicating Character" article, pages 24-29—Fixtures used at the Gallery at Harborplace, shown on page 25, and attributed to Sterner on page 28, were actually produced by Winona Lighting Studio. Our apologies.

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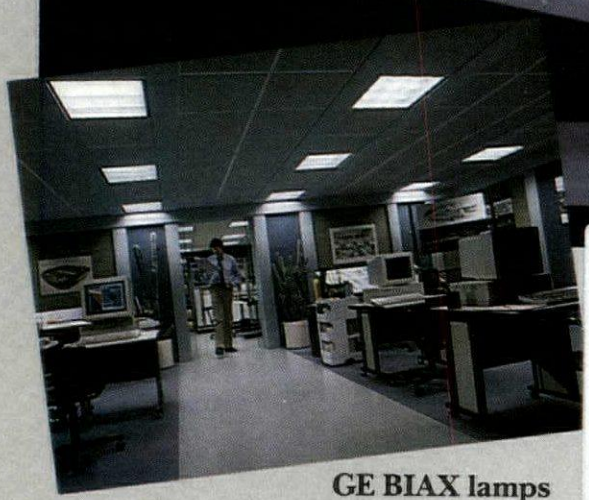

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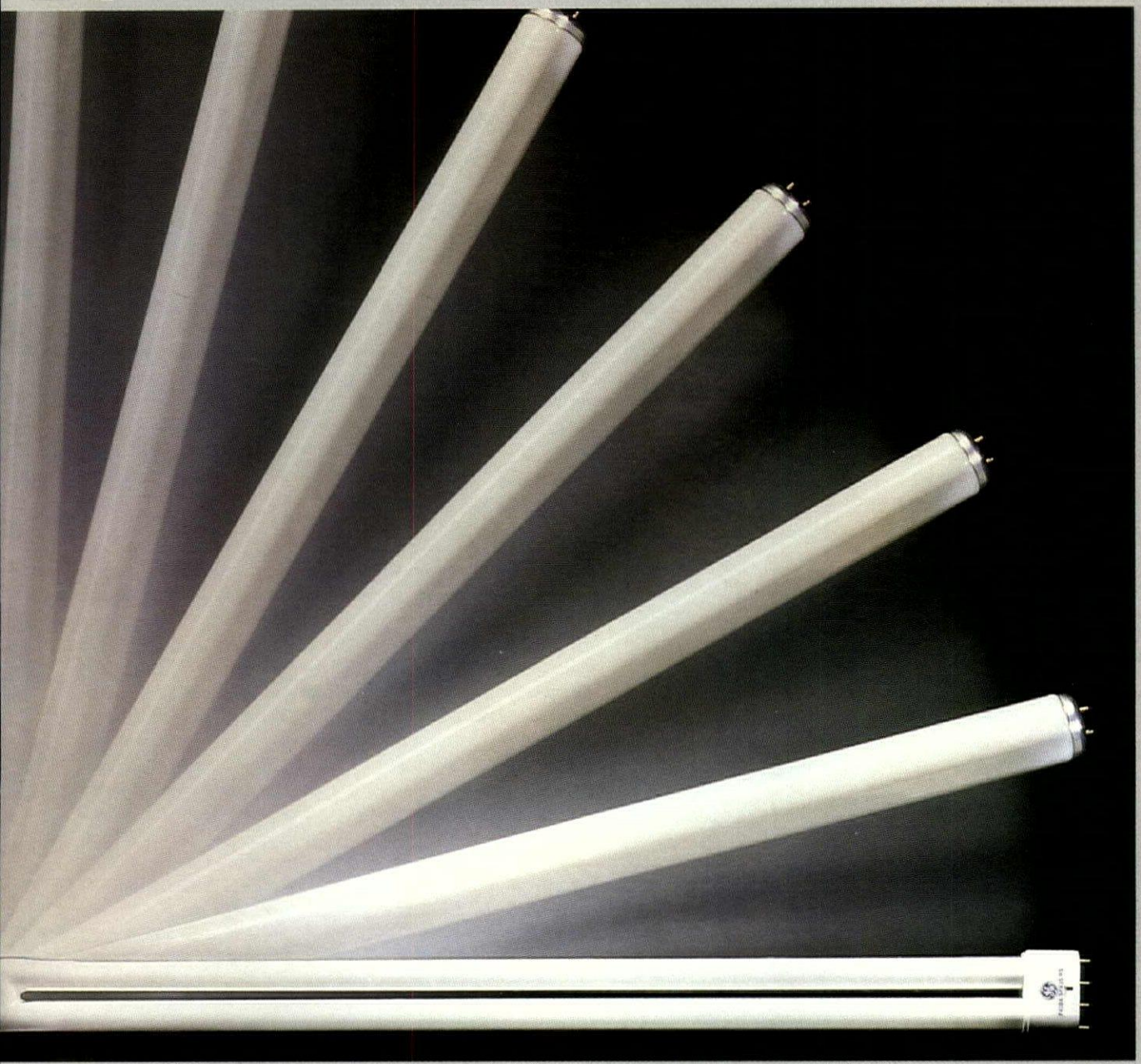

cents can, the lighting you design will make the environment and the people who work in it more attractive.

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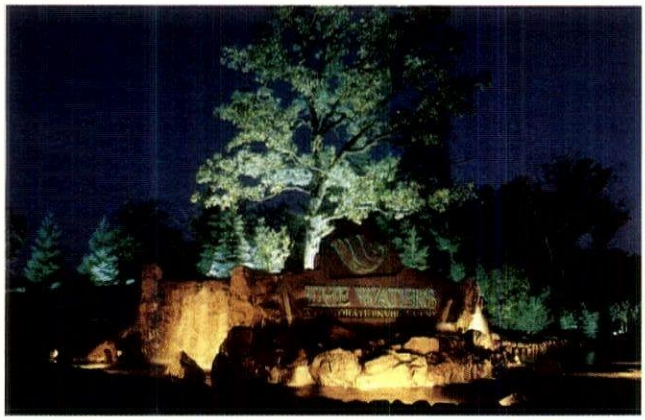
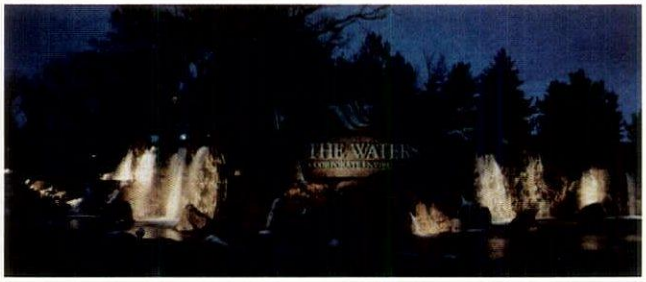
Floodlighting On The Waters' Front





CREATING A SCENE: The natural beauty of The Waters' wooded landscape is enhanced by its nighttime illumination, setting a scene that draws attention to the location, and attracts companies to the site.

DETAILS
PROJECT: *THE WATERS*
LOCATION: *MINNEAPOLIS*
PHOTOGRAPHER: *TERRY ANDERSON, Glen Silker Photography*
LANDSCAPE ARCHITECT: *BOB HAUCK, Arteka*
LIGHTING DESIGNER: *PATRICIA YORKS, IALD*
ELECTRICIAN: *MIKE DRIES, AID Electric*
LIGHTING MANUFACTURERS: *KIM: uplights for main tree and evergreens, burial well lights for smaller deciduous trees; HUBBELL: pond lighting*

BY CHRISTINA LAMB
ASSISTANT EDITOR

CHALLENGE The Waters, a 121-acre office/industrial park, boasts an entrance sure to attract businesses to this corporate site. Positioned along the main highway, the park's entry is marked by a 750-foot northern Minnesota wooded landscape, with falling water as its key feature. The natural setting required lighting that would add perennial drama.

DESIGN/TECHNICAL CONSIDERATIONS The lighting system had to be well integrated with the environment, enhancing the landscape material, yet remaining unobtrusive. Accessibility, efficiency, and low maintenance were required, and versatility was important for duplication and extension of the design throughout the park's development. Due to the nature of the setting, emphasis had to be placed on choosing fixtures that are resistant to damage by water or harsh climate conditions.

METHOD Two existing century-old oak trees are the focal point of each entrance. The more dominant of the two is illuminated with eight ground-mounted 100-watt, 3,000K metal halide fixtures, while a combination of 130-volt, 300-watt PAR 56 narrow spot and medium flood fixtures light the secondary oak. Evergreens, illuminated with 100-watt clear mercury lamps, provide a backdrop to the landscaped space. Some of these fixtures are ground-mounted close to the trees, while others are placed farther back for respective vertical and horizontal distribution. Deluxe 100-watt mercury lamps uplight smaller deciduous trees that are interspersed throughout the landscape. The cascading water is illuminated by 130-volt, 300-watt PAR 56 narrow, very narrow spot, and medium flood fixtures. These fixtures crosslight from behind custom boulders designed to conceal and shield them from water and extreme temperatures. Backlit weathered copper letters, announcing the park's entrance, provide a watertight housing for the teal-colored neon that outlines and highlights them.

CONCLUSION The Waters provides instant identification for the area and is an effective marketing tool, drawing interest from companies looking to settle. The corporate park is home to Northern Airlines, Cray Research, and a future convention center and hotels. Minnesota's long season of snow, frost, and ice provide varied special effects in conjunction with the lighting. Traffic patterns and light levels, both in and around the project, were studied to maximize the entry's visibility from major roadways; the site is visible from two miles across undeveloped acreage. Operating and maintenance costs, including relamping, cleaning, and energy average $40 per fixture per year with the incandescent and metal halide sources requiring new lamps every 5.4 years.

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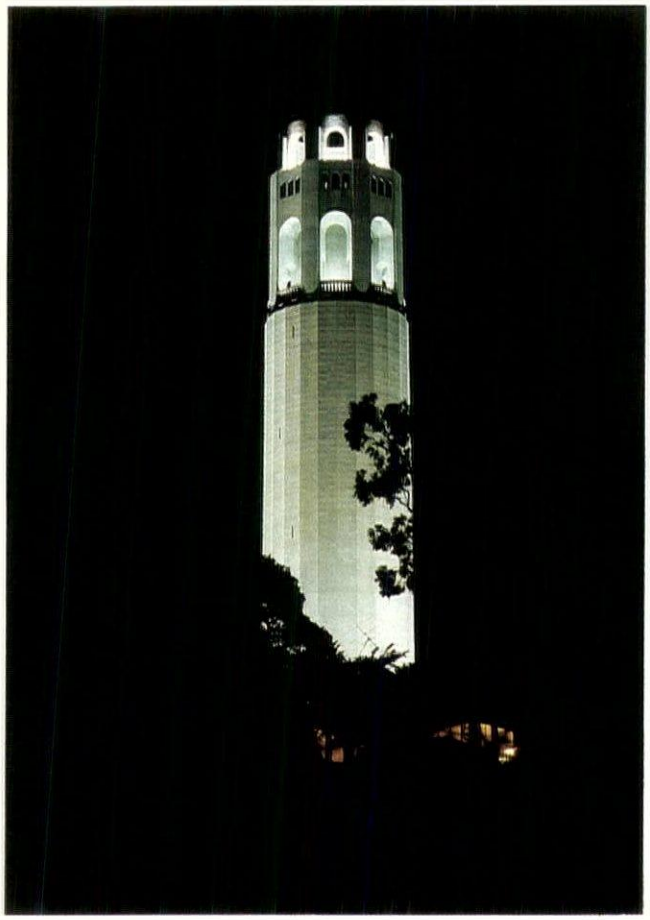
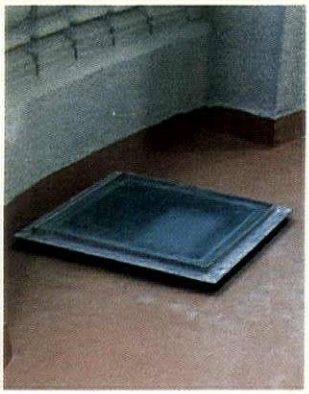
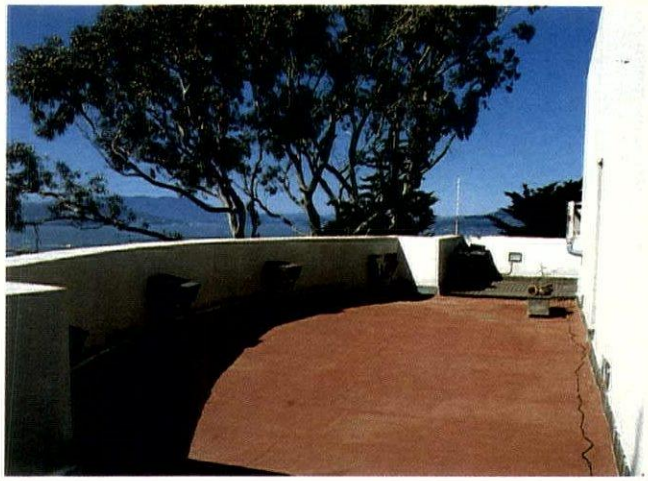
Landmark Lighting—San Francisco's Coit Tower





STANDING TALL: Metal halide floods (right, below) uniformly illuminate the Coit Tower (left) creating contrast, adding color, and increasing its visibility.

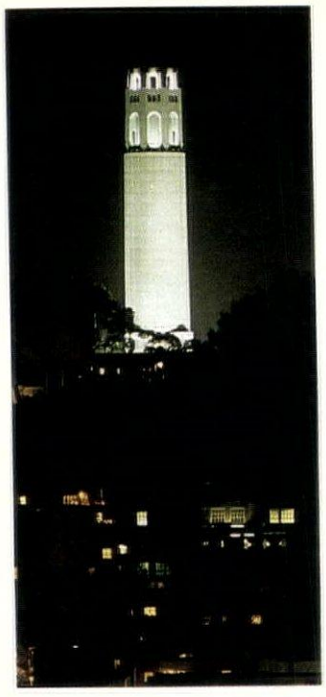


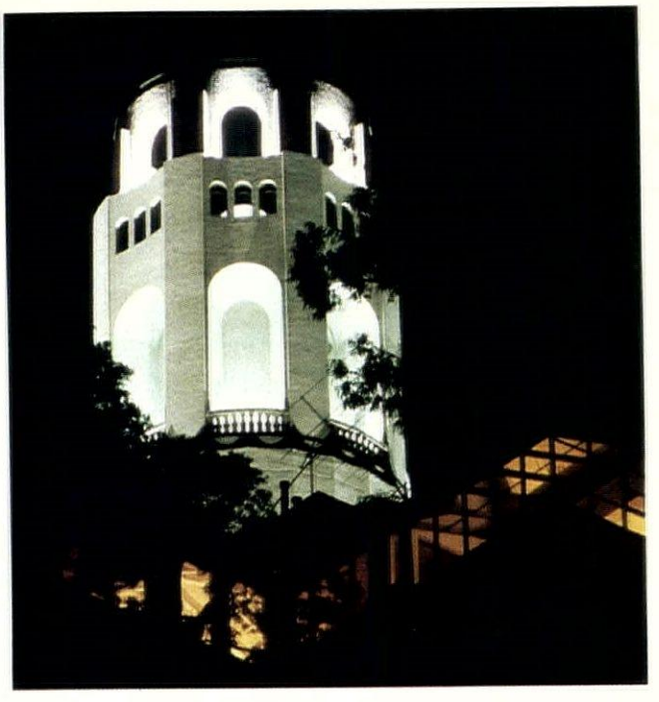
BY CHRISTINA LAMB
ASSISTANT EDITOR

CHALLENGE Towering 210 feet over the San Francisco Bay area stands the 33-foot diameter Coit Tower. Atop Telegraph Hill, a residential area encircled with homes and hills, this historical edifice is a lookout, a tourist attraction, and a monument of San Francisco. In fact, it is one of the city's most visited sites. The landmark tower, completed in 1933 and dedicated in October of that year, still remains a bold feature of the city's skyline and provides panoramic views of the Pacific Ocean, Golden Gate Bridge, and all that surrounds. The tower—named for past local resident Lillie Hitchcock Coit, who upon her death in 1929 bequeathed one-third of her inheritance to San Francisco to beautify the city—is visible for miles from all directions. When the landmark was recently restored, the lighting system had to be revamped to uniformly illuminate the tower, adding contrast and color to increase its visibility around the bay, while saving energy and reducing maintenance.

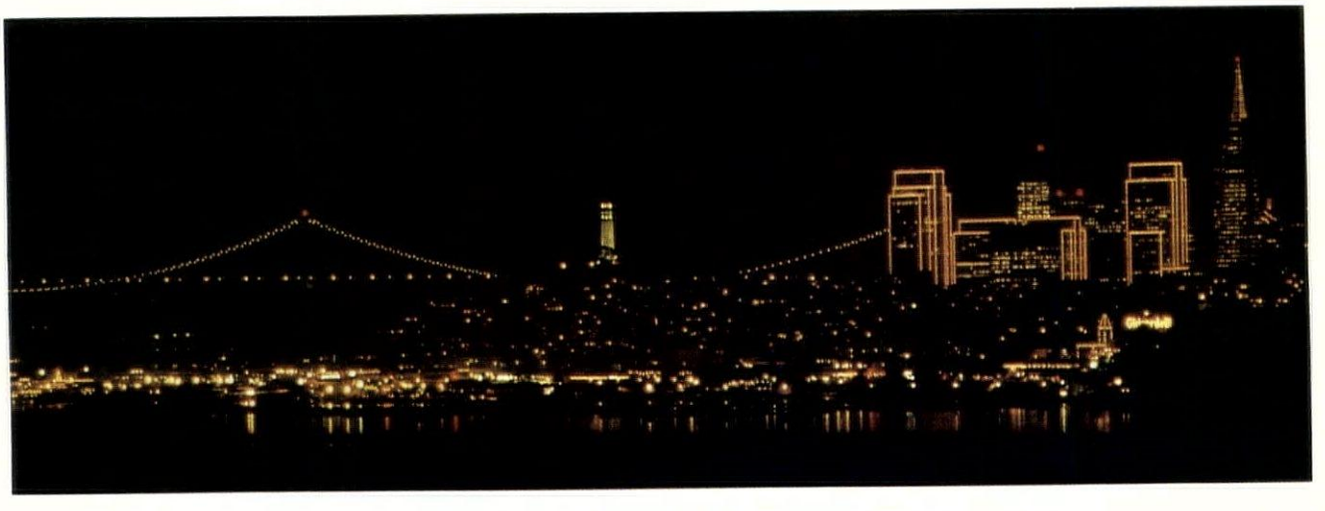
DESIGN/TECHNICAL CONSIDERATIONS Being a historical landmark, the structure's architectural form could not be altered. The tower was originally illuminated with 20 750-watt incandescent floodlights; the lamp type could be changed, but the existing mounting bolts had to be used. A low budget required a retrofit to yield energy savings and offset the initial cost. Since Telegraph Hill is residential, surface brightness and light trespass had to be minimized, and the system had to withstand the atmospheric conditions of its coastal location—salt, wind, fog, and varying changes in temperature. Furthermore, competition from other lit structures, such as office buildings, called for a system that would distinguish Coit Tower from other illuminated architecture.

METHOD Design success was achieved by alternating 20 narrow and widespread 400-watt, 4,300K metal halide floods, tilted 5 degrees, around the tower's base. Using the





HISTORICAL PERSPECTIVE: Coit Tower, a popular San Francisco site for more than 50 years, provides a 360-degree view of its surroundings, and is a glowing element of the city's skyline.

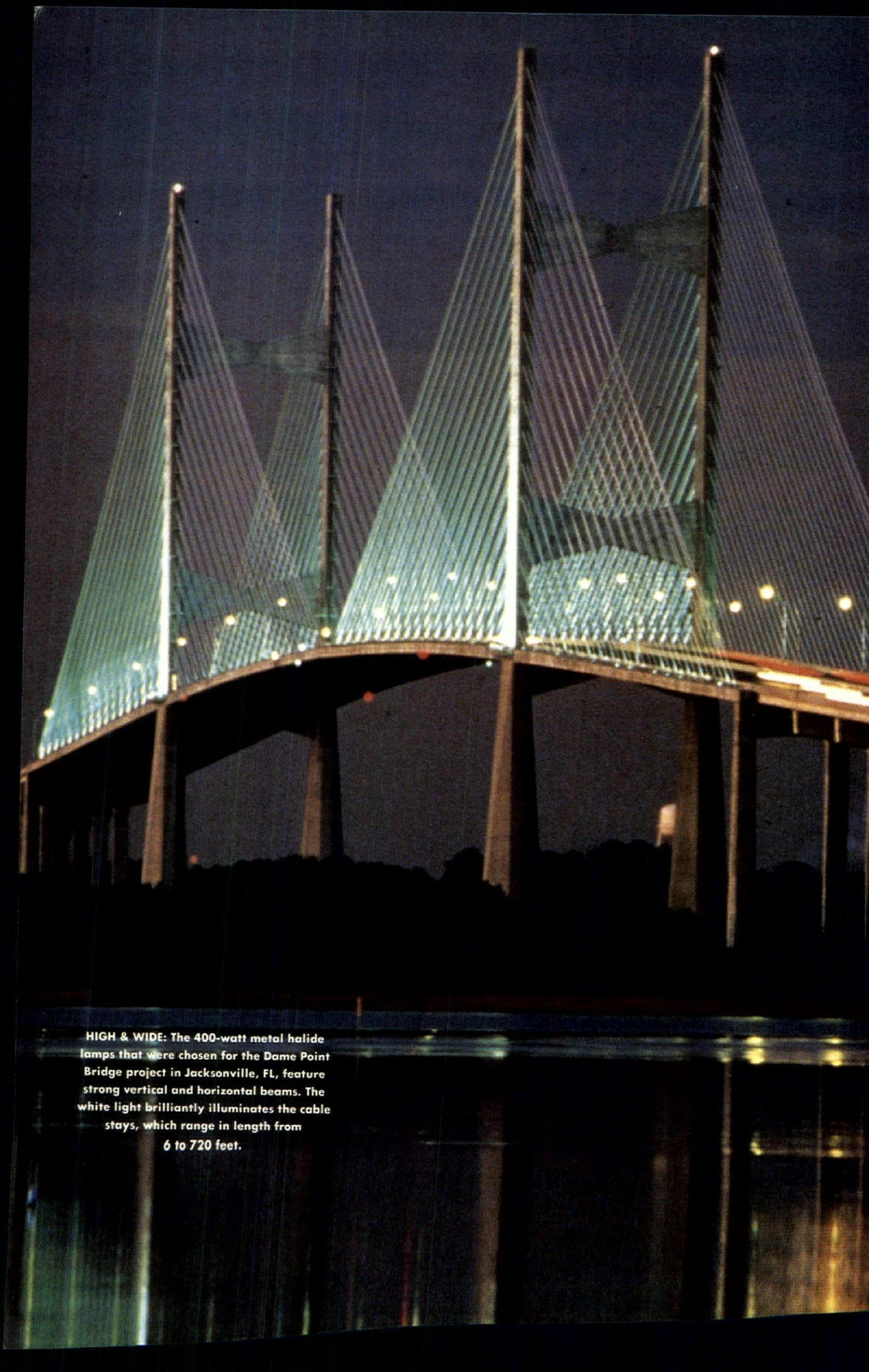


lower half of the beam to light the tower creates uniform surface brightness. A short wall around the base of the tower, where the floods are located, allows only a 6- to 8-foot setback for the fixtures, which impedes illuminating the tower surface uniformly. Custom mounting brackets that adapted to the existing bolts and fit the trunion of the floodlights were designed and mounted to the wall. The existing bolts remained, the fixtures were removed, and brackets were built to hold the new floods. The large arches are illuminated by 250-watt, 4,300K metal halide floods, recessed in the floor and aimed straight up toward the tower. Recessed in a trough, approximately 1 foot wide, and 10 inches deep, 70-watt 3,000K double-ended metal halide floods are also aimed straight up toward the tower to illuminate the small arches.

CONCLUSION Using standard manufactured, rather than custom designed, products reduced lead time and cost, allowing project completion below budget; $5,000 was spent on materials. Analysis was performed to show energy savings and to justify the design. A 40 percent reduction in wattage and a significant reduction in maintenance substantiated the change from incandescent (2,000-hour life expectancy for a 750-watt lamp) to HID sources (15,000-hour life expectancy for a 400-watt metal halide lamp). The combination of wattages and Kelvin temperatures creates contrast on a structure with few architectural dimensions, and enhances the texture without imposing on the surrounding homes. The project won an IES section award, and was given a regional award of merit.

DETAILS

PROJECT: *COIT TOWER*
LOCATION: *TELEGRAPH HILL, SAN FRANCISCO*
LIGHTING DESIGNER *IVAN HAWTOF*
ELECTRICIAN: *CITY OF SAN FRANCISCO*
PHOTOGRAPHER: *BRUCE FORRESTER PHOTOGRAPHY*
LIGHTING MANUFACTURERS: *HUBBELL: MHP series 40-watt metal halide lamp with Nema 4 X 3 and 6 X 6 beamspreads; MHS series 250-watt metal halide lamp with Nema 7 X 7 beamspread: MIC series 70-watt metal halide lamp with Nema 5 X 6 beamspread; MARIO AVENDANO: mounting brackets for floodlights*



HIGH & WIDE: The 400-watt metal halide lamps that were chosen for the Dame Point Bridge project in Jacksonville, FL, feature strong vertical and horizontal beams. The white light brilliantly illuminates the cable stays, which range in length from 6 to 720 feet.

PHOTOGRAPHS: LEFT AND OPPOSITE, LARRY WEHNER

Gilding The Lily

Lighting lifts the sails of Jacksonville's Dame Point Bridge

BY CATHERINE SCHETTING SALFINO
MANAGING EDITOR

Like the tall, white sails of a wind-powered vessel, the illuminated cables of the Dame Point Bridge rise up over the St. Johns River in Jacksonville, FL. The graceful structure, which provides six lanes of the expressway for 20,000 cars a day, artfully bridges the gap in Interstate 295 beltway that runs around downtown Jacksonville.

At 1,300 feet, the bridge's concrete cable-stayed main span is the longest in the Western Hemisphere and the longest of any material in the United States. The structure, which was designed by Howard Needles Tammen and Bergendoff, was opened to traffic March 10, 1989, and has been snapping up lighting and engineering honors ever since (see sidebar).

"We wanted to light the bridge like we would a really nice sculpture," says Robert J. Laughlin, principal of Robert J. Laughlin & Associates in Winter Park, FL. "The whole bridge is such a beautiful piece, we wanted to emphasize it with lighting effects."

The structure features a double plane of cable stays that are in a harp configuration. The double plane is very efficient and economical for the long length of the main span, says Larry P. Wehner, senior highway engineer for the Jacksonville Transportation Authority (JTA) and Dame Point Bridge project manager. By implementing double planes, the team was able to create a thin, ribbon-like structure, with the roadway being only 5-feet thick from its top to bottom. The 288 cables that ascend from the roadway are spaced every 17.5 feet and range in length from 60 to 720 feet.

"We decided to install a light on every other cable," says Laughlin. "We needed a source that has a very strong vertical and a very wide horizontal beamspread."

Additionally, such factors as salty air, car exhaust, and moisture-heavy air due to the close proximity to

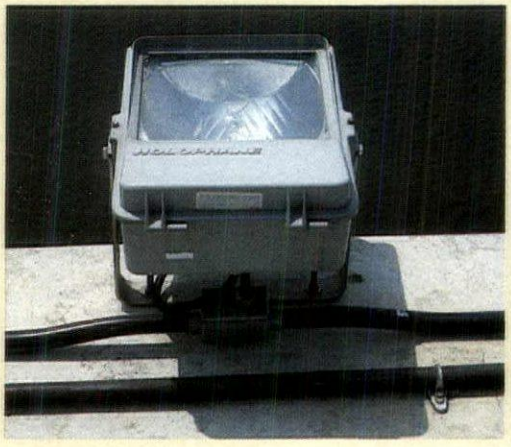
PHOTOS BY LARRY P. WEHNER AND RICK CARLSON

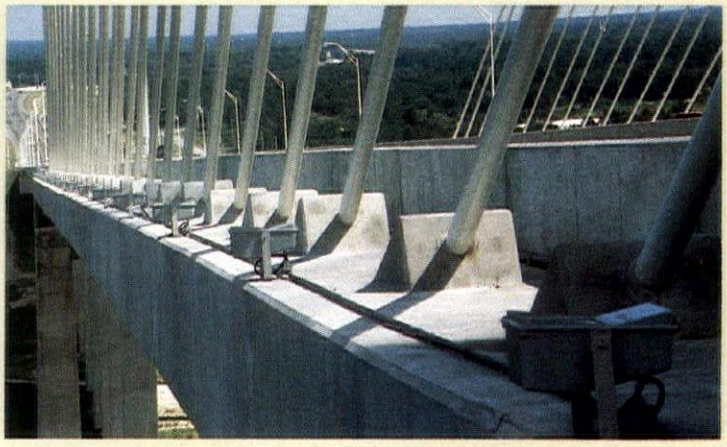
the water had to be taken into consideration. Laughlin worked closely with Wehner and Gerald R. Lukach, project engineer, of the Sverdrup Corporation, Jacksonville, FL, who employed a computer-aided design (CAD) program to help in the design process.

"Our charter at JTA is to build roadways and such," Wehner says. "Lighting the bridge looks nice, but it's not essential. So we had to do a fair amount of work to estimate costs before we could go to our board for approval."

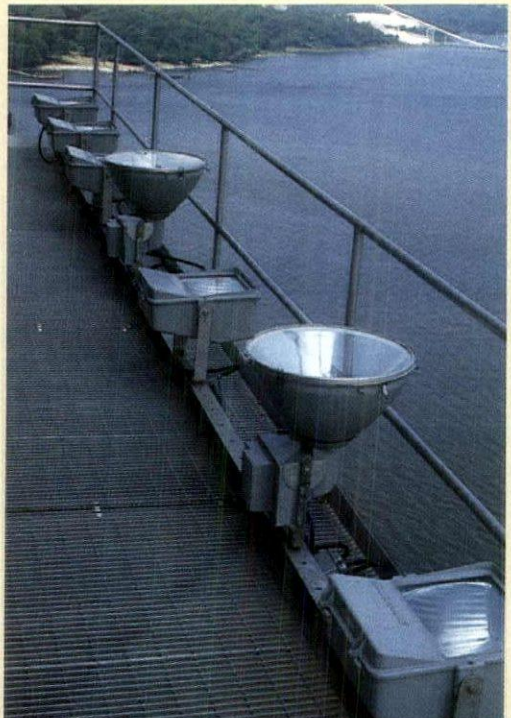
The lighting for the $109 million bridge cost about $400,000 for installation, $42,900 for fixtures, and $8,900 each year for electricity and maintenance. Lamps were donated by the manufacturer.

The team illuminated the cables with 400-watt metal halide lamps housed in weatherproof enclosed fixtures. The fixtures are mounted at the base of every other cable, about 3 feet





CABLE READY: The metal halide lamps are aimed straight up the bridge cables (above, left) at the base of every other cable (above, right). The metal towers are lit with 400- and 1,000-watt halides and 400-watt HPS lamps (below).



LIGHT THE TRAFFIC CAN BEAR

SIDE LIGHTS

BEFORE THEY COULD ILLUMINATE the Dame Point Bridge, the project's lighting team had to calm some fears held by local navigation and aviation officials.

"It seemed members of the shipping industry didn't want any type of bridge lighting in their path up the St. Johns River," says Larry P. Wehner, senior highway engineer for the Jacksonville Transportation Authority and bridge project manager. "I held meetings with the captain of the Coast Guard and the bar pilots to show them that the lights would not affect the navigation of their ships."

Wehner says he showed them pictures of the Sunshine Skyway Bridge in Tampa to point out how lights on that bridge shine straight up. And he told them the Dame Point Bridge lighting would be mounted the same way, so as not to interfere with any navigational lighting.

Concerns also stemmed from officials at two airports located near the bridge—Craig Field and the Jacksonville International Airport.

"They wanted to be sure the bridge lighting would not look like a runway from their aerial view," Wehner says. "And they were also concerned that the lighting might shine up at an angle and interfere with their flight path."

The lighting shines straight up the cables, not at angles that would jeopardize a pilot's vision, and only the bridge's main span is illuminated, so it doesn't look like a runway.

"Now they like it because it serves as a landmark for them and it brightens the bridge, bringing it out of the dark," he says.

PHOTOGRAPHS BY PETER BOTTOMLEY, LARRY WEHNER; TOP RIGHT, BUCK CARLSON

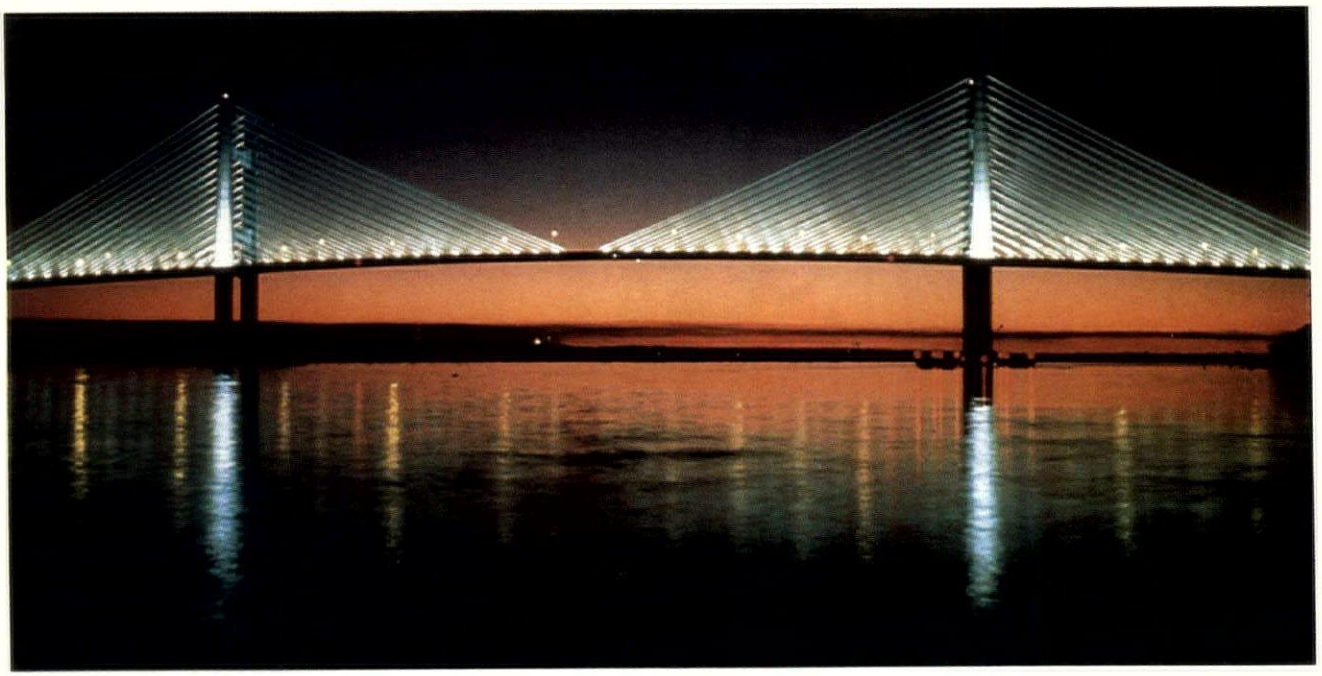
from the cable itself, and aimed straight up.

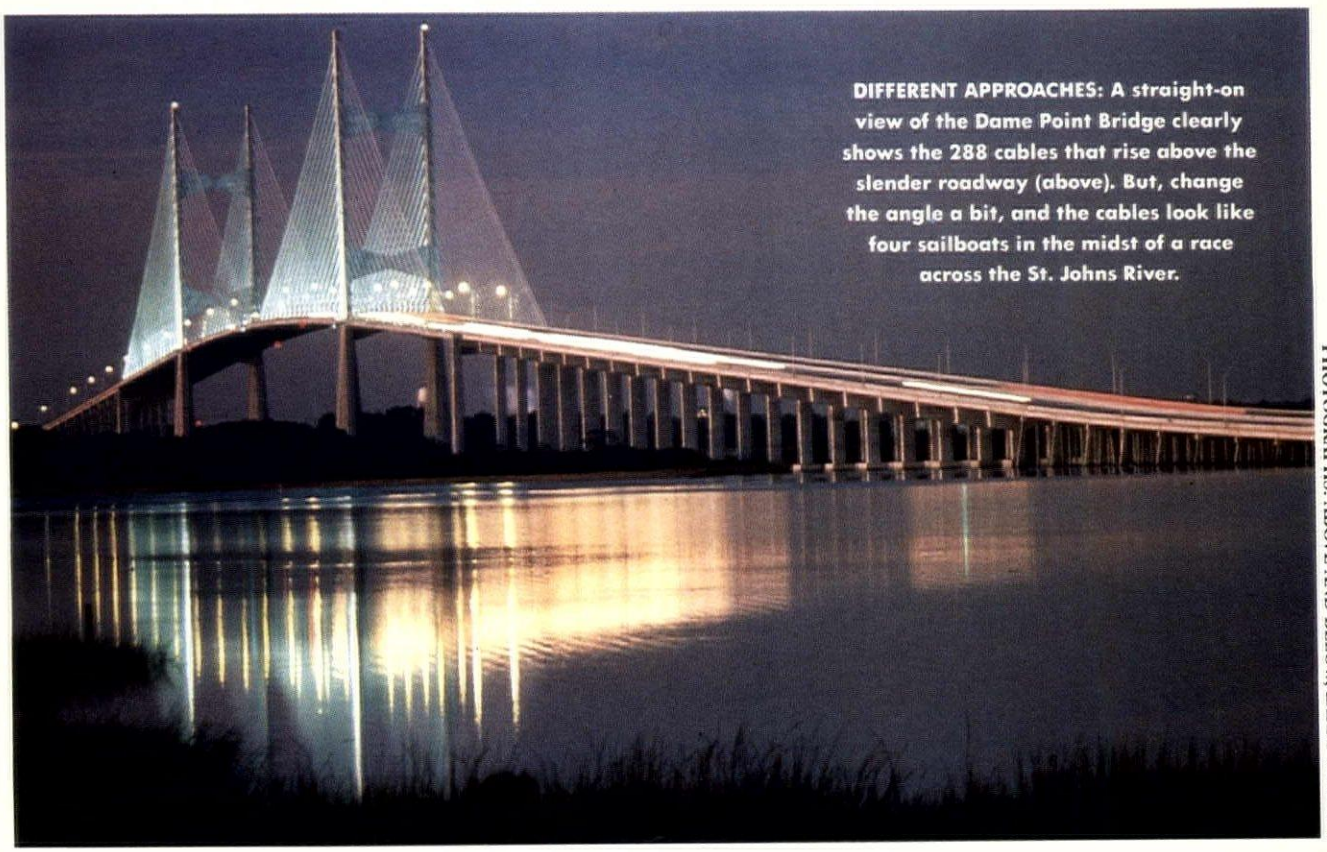
"We chose the lamps for their good color rendition, efficiency, and long lamp life," Laughlin says. "But mostly for the color because we wanted the bridge to look crisp and white, as opposed to orange, which is what you get when you use high-pressure sodium."

The HPS lamps weren't totally abolished from the project, however. The lower portion of the bridge towers are illuminated with 400-watt HPS lamps.

"I wanted to warm up the towers a bit because they are raw concrete, and I wanted them to have just a little color," Laughlin says. "The HPS beams don't stand out because they're mixed in with the metal halide, but you get the warmth out of them."

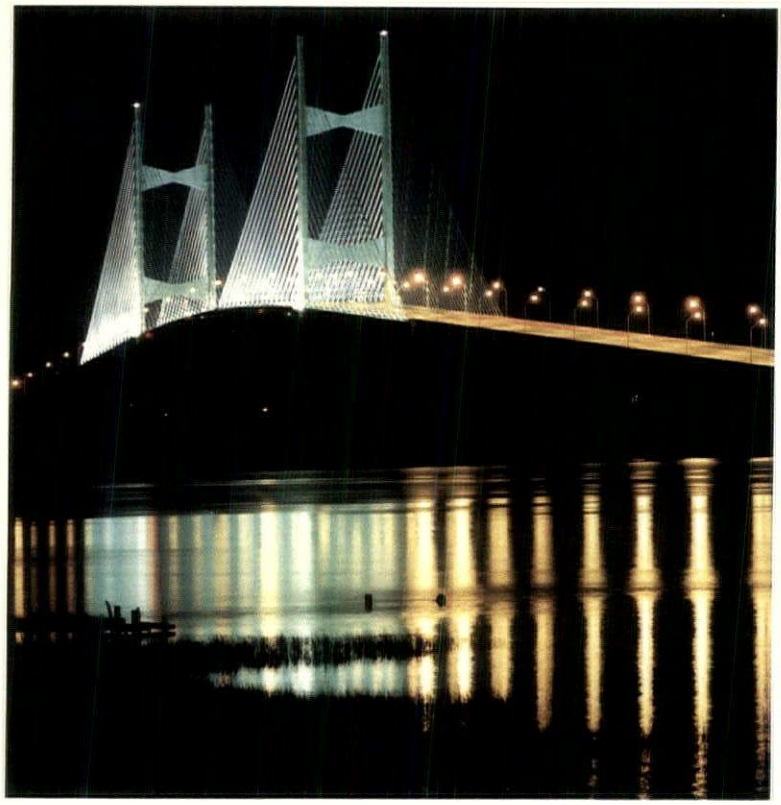
The HPS sources used on the towers also blend with the HPS lamps used in the standard street lights required by the JTA.

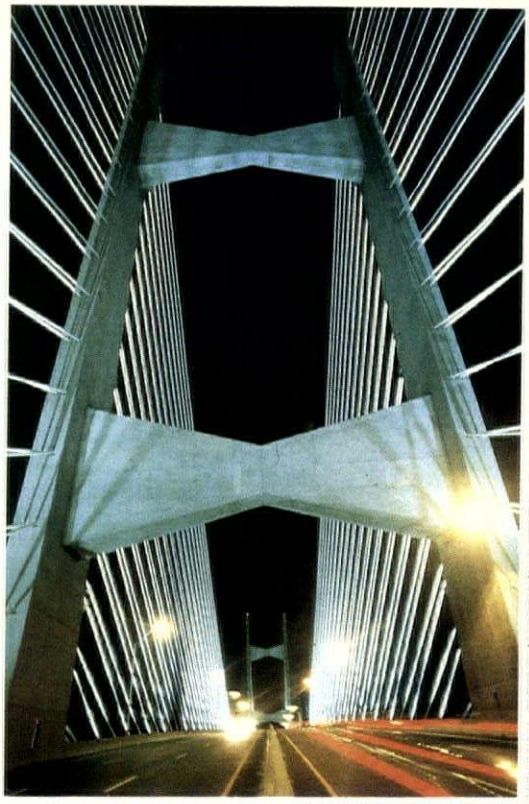




DIFFERENT APPROACHES: A straight-on view of the Dame Point Bridge clearly shows the 288 cables that rise above the slender roadway (above). But, change the angle a bit, and the cables look like four sailboats in the midst of a race across the St. Johns River.

PHOTOGRAPHS: ABOVE AND BELOW, LARRY WEHNER





PHOTOGRAPHS: LEFT, RICK CARLSON; RIGHT, LARRY WEHNER

ARCHITECTURAL EXCELLENCE: The Dame Point Bridge is illuminated with 172 metal halide lamps, which emphasize the magnificence of the bridge both outside and inside the cables.

Since the lower wattage lamps didn't have the power to reach the top portion of the towers, two narrow spot fixtures housing 1,000-watt metal halide lamps were specified for each tower. The section of the bridge that the cable lamps are mounted on runs into the towers, so special platforms had to be built to permanently mount the tower fixtures. These platforms alone cost $100,000, Wehner says.

The metal cables were painted for corrosion protection, and the reflective white color that was chosen causes the lamps to cast a celestial glow inside the bridge without any fixtures being placed there.

"That normally wouldn't happen, based on the placement of the light sources," Laughlin says. "This project has a little magic to it, quite frankly, and I'll be the first to admit that. The light glowing inside the bridge just adds another dimension to the project. And the quality and intensity is balanced so that it doesn't bother the motorists."

Laughlin says the bowties that stretch between the towers weren't illuminated for budgetary reasons. But, he says, that doesn't seem to matter as the reflection from the cables brightens them just as effectively.

The lighting has been equally as effective in gaining approval from people in the Jacksonville area, Wehner says.

"They don't just say they like the bridge, they say they love it," he says. "In fact, in what was the most negative comment I received, one person said the bridge should be downtown instead of out on the beltway—because it's too pretty to have out there." ■

BRIDGE HONORS & AWARDS

- **International Association of Lighting Designers—1989 Award of Excellence Citation**
- **1990 Florida Night Beautiful Award—specialty lighting category**
- **Concrete Reinforcing Steel Institute—one of five selected nationwide for 1990 Design Awards**
- **American Consulting Engineers Council—Grand Conceptor Award 1990**
- **National Society of Professional Engineers—one of 1989's Eight Outstanding Engineering Achievements**
- **Associated General Contractors—1989 Build America Award**
- **Arts Assembly of Jacksonville—14th Annual Arts Awards, architectural design category**
- **American Society of Civil Engineers—Outstanding Civil Engineering Achievement, District 10**

DETAILS

PROJECT: *DAME POINT BRIDGE*
LOCATION: *JACKSONVILLE, FL*
CLIENT: *JACKSONVILLE TRANSPORTATION AUTHORITY*
LIGHTING DESIGNER: *ROBERT J. LAUGHLIN, ROBERT J. LAUGHLIN AND ASSOCIATES*
DESIGNER: *HOWARD NEEDLES TAMMEN AND BERGENDOFF*
ENGINEER: *SVERDRUP CORPORATION*
PHOTOGRAPHERS: *LARRY P. WEHNER, AND RICK CARLSON; COVER PHOTO BY RICH FRANCO*
LIGHTING MANUFACTURERS: *HOLOPHANE: Predator heavy-duty floodlights, Prismbeam narrow-spot fixtures; PHILIPS: 400-watt HPS lamps, 400- and 1,000-watt metal halide lamps*

THE AURORA SCONCES, entryway canopy and carved glass window adorn the Cosmopolitan, a 140-unit apartment building in Philadelphia, completed in November 1989.

Artist At Work

The edge-lit glass and patinated bronze sconces designed by artist Ray King add class and character to the Cosmopolitan in Philadelphia

BY WANDA JANKOWSKI
EDITOR-IN-CHIEF

People in town say they prefer to drive down that street now becasue it is something they like seeing," says artist Ray King. The "it" refers to the Aurora sconces, canopy, and window, designed to grace the exterior of Philadelphia's Cosmopolitan, an upscale, 140-unit apartment building, with ground-level retail space.

The main entrance to the building is marked by a 14-foot wide, 9-foot 9-inches deep, and 3 foot high cantilevered canopy.

"The canopy is made of steel and glazed with half inch safety glass cut with a saw-toothed edge. At the apex of the cone-shaped canopy is a bronze and glass lighting element used to light the sidewalk," King says. The decorative and functional lighting element uses 15 26-watt fluorescent quad lamps.

Above the canopy is a 13-foot high, 14-foot wide glass window, carved with high-relief images of ribbon spirals and floating forms. It is illuminated from within the lobby by ceiling recessed spotlights.

Completing the statement at the entrance are two large sconces that flank it. They are each 6 feet high

PHOTOS BY EDWARD SILVERMAN

There's a requirement that anyone doing projects on Redevelopment Authority land has to dedicate one percent of the project to public artwork. King chose to use lighting as art.

ARTISTIC CONTROL

SIDE LIGHTS

KING MAKES HIS ARTWORKS in his own studio.

"I think the relationship of having hands on the materials and being a maker is different from only designing the fixture," King says. "You get to know the unique characteristics of each material. For example, how glass behaves with light.

"Also it's very hard to get something made by an outside manufacturer to the criteria I'm interested in, especially since the artworks are produced in limited quantities. The glass to metal fit, for example, is very specific. It's got to be just right, and it's hard to define that to someone else.

"And then other pieces we do are just so big. One project we are working on is for a 54×80 foot wall, with sculptural elements that are 4-25 feet long. It would be so hard to get the elements made on the outside," King says.

"I usually start with drawings and then, in most cases, proceed to build a model," King says. "Every project has its different requirements, but what happens many times is that clients contact me because they like something I've done."

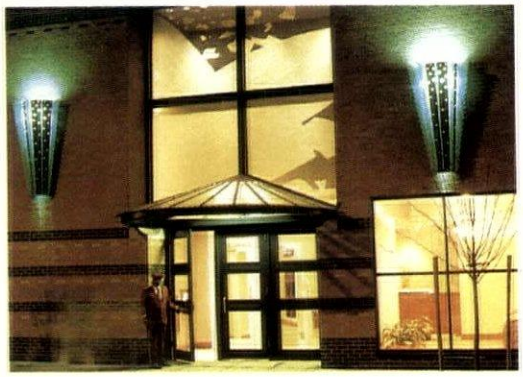
and 4 feet across at the widest point, and illuminated from within by 175-watt metal halide lamps.

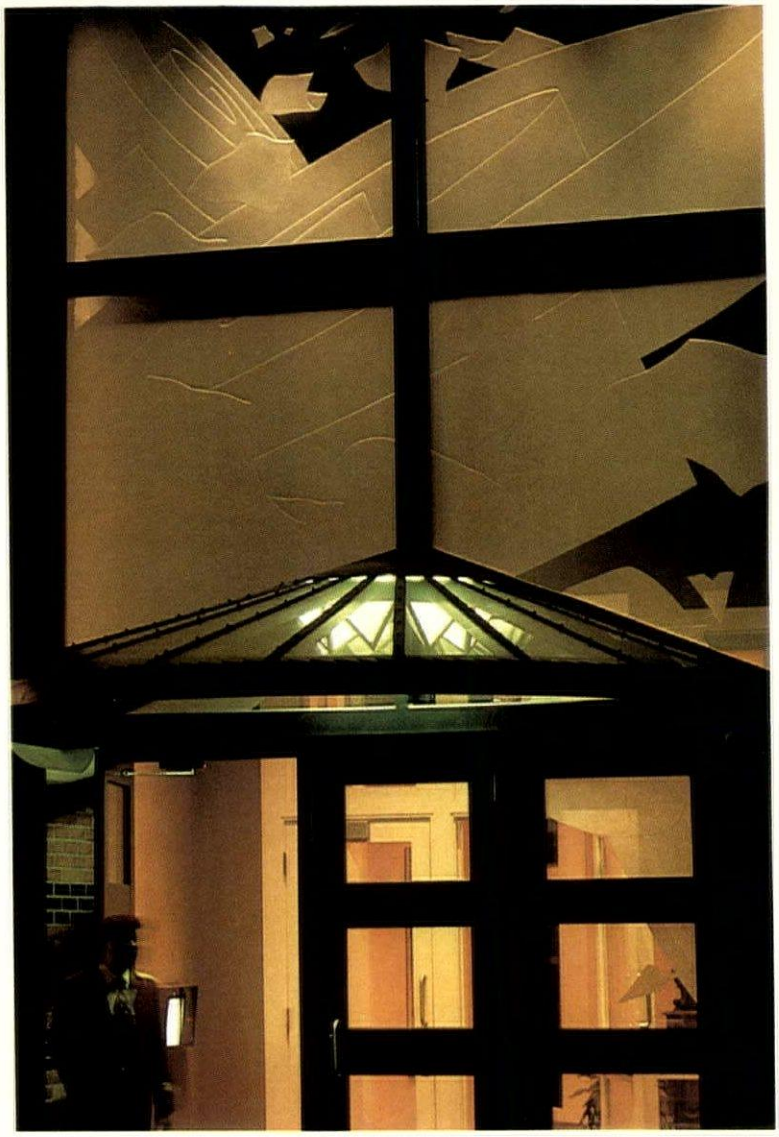
To visually tie the rest of the building to the entrance, eight smaller versions of these sconces, 3 feet high and 30 inches across at the widest point, run along the two exposed sides of the building. These are lit from within by 100-watt metal halide lamps.

All the sconces are actually shells made of bronze and glass that have been created by King to fit over standard exterior fixtures. King treated the bronze in his studio to give it a blue-green, corroded finish.

"The patina actually acts as a protective skin for the bronze," King says. Holes punched in the bronze have been inset with ¾ inch hemispherical glass lenses. Five glass radial fins also intersect the bronze and project out from it.

"The glass I used is float glass, which is regular window glass, only in heavier pieces, ⅜-, ½-, and ¾-inch thick," King says. The glass has been laminated as a safety feature.





"I was concerned that if someone attempted to damage the sconces, the glass fins wouldn't break and fall on the heads of passersby. But as yet, nothing has been broken since the project was completed in April 1989," King says.

King considers the edge-lighting of the glass fins one of his trademarks.

"The edge of the glass drives through to the interior or what I call the 'lightway'—the area where the glass is exposed to the source of illumination," King says. This exposure allows the light to be released at the opposite edge of the fin, producing a luminous glow.

The Aurora sconces, canopy, and window came about as the result of a competition.

"The Cosmopolitan was built on land owned by the Philadelphia Redevelopment Authority, an organization set up to redevelop blighted areas. The authority assembles sites and markets them to developers," King says. "There's also a requirement that anyone doing projects on Redevelopment Authority land has to dedicate one percent of the project to public artwork.

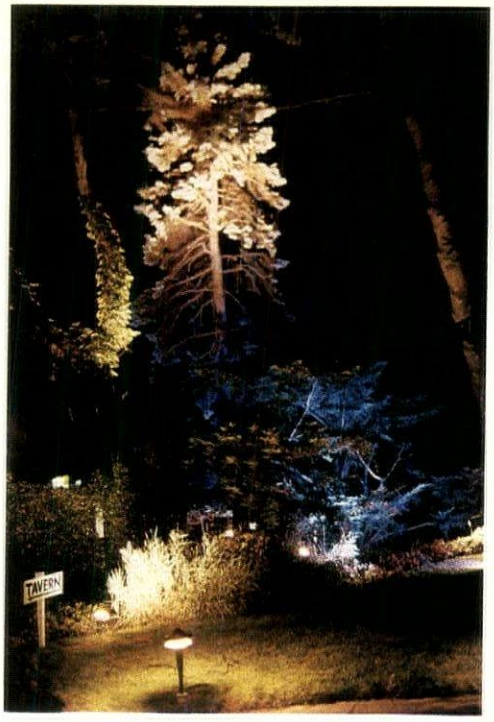
"The artwork did not have to be in the form of light fixtures, but it had to be visible from the street. The developers did want a canopy, and I proposed putting in the carved glass window above it," King says. "Two shortened flagposts for holding banners flanking the entryway had been in the architect's original drawing. I proposed the sconces instead."

Originally, lampposts and trees were planned to run parallel to the curbside around the exposed sides of the building, before King recommended the sconces instead. ■

EXTERIOR ART: King continued the bronze and glass sconces around the two exposed sides of the building (opposite page). The sconces are lit with metal halide lamps (left, top & bottom). The canopy is lit with 26-watt quad lamps (above).

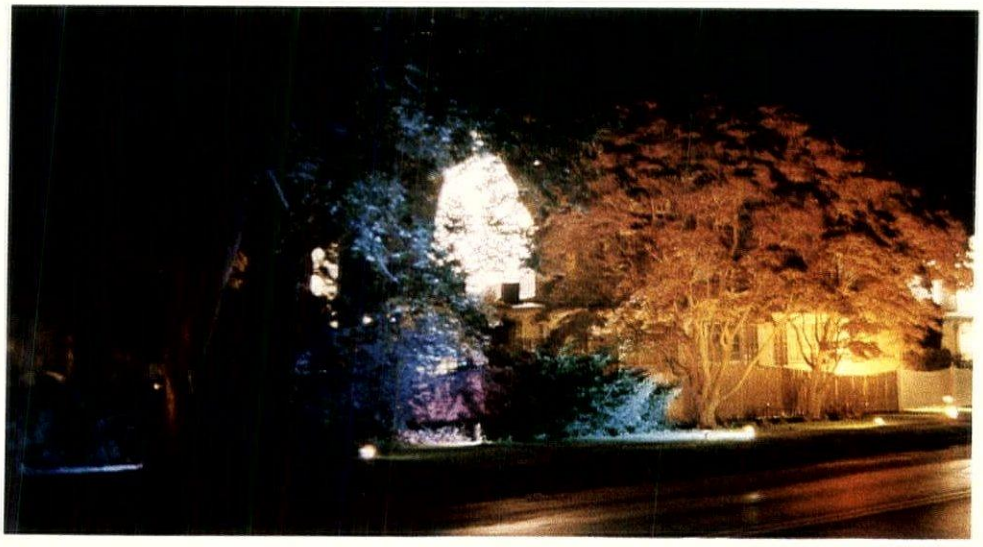
DETAILS

PROJECT: *THE COSMOPOLITAN*
LOCATION: *PHILADELPHIA*
DEVELOPER: *GROWTH PROPERTIES, INC., under the auspices of the REDEVELOPMENT AUTHORITY OF PHILADELPHIA FINE ARTS PROGRAM*
ARCHITECT: *SHEWARD-HENDERSON*
ENGINEER: *DAVID CHOU, BERNARD SCHWARTZ AND ASSOCIATES*
ARTIST: *RAY KING, RAY KING STUDIO*
PHOTOGRAPHER: *EDWARD SILVERMAN*
LIGHTING MANUFACTURERS: *RUUD and STONCO for the exterior fixtures beneath the sconces*



Turning A New Leaf

Bowden Square's landscape comes to life with dichroic lamps



SPRUCING UP: Bowden Square's Colorado Blue Spruce (top left) is lit in front with a dichro blue filtered lamp and from behind with a 90-watt VNSP to produce a moonlighting effect. The auburn hues of the Japanese Red Maple are emphasized with 150-watt dichroic filtered lamps (above & left).

BY CATHERINE SCHETTING SALFINO
MANAGING EDITOR

A truly blue spruce. A really red maple. The technicolor flora jumps out from its South Hampton roadside fairly demanding passersby to take a closer look at the restaurant and period tavern it surrounds. The magic of dichroic lamps engulfs Bowden Square in Long Island, NY.

"I had two primary lighting concerns with this project," says lighting designer Robert Singer, principal of Robert Singer & Associates, Inc., New York. "I wanted to create some sort of a hook that would draw people off the main thoroughfare and into this beautiful garden. And I wanted to light the facia of the main building so that passing motorists could see the restaurant behind the illuminated landscape."

Lighting was an important hook because, prior to Singer's application, the site went without exterior illumination. When prominent New York restaurateur Michael "Buzzy" O'Keefe (owner of such restaurants as the Water Club and River Cafe) took over the dining spot, he realized the space had potential for more traffic. Singer says O'Keefe was aiming to attract two types of clients—an older, more conservative crowd that would appreciate distinctive dining, and a younger set for the tavern.

PHOTOS BY ROBERT SINGER

INDOOR & OUTDOOR COMPARISONS

SIDE LIGHTS

Every job has its idiosyncrasies, but they all require the same type of input, says Robert Singer, lighting designer and principal of Robert Singer & Associates, Inc.

Whether working on a retail space, which Singer focuses on, or a landscape project, a lighting designer is still dealing with general and specific illumination, he says. The design has to accommodate ambient and task lighting, and take into account crowd or traffic patterns.

"In both cases, you still have a lighting palette and you have to layer the illumination to get what you want," he says. "Whether indoor or outdoor, you are still dealing with the concept, the development, and the execution."

Singer's mission was to come up with this enticing lighting scheme in five days for under $5,000.

"Buzzy contacted me in 1988, five days before the July Fourth weekend, and said he wanted the lighting design conceived and delivered by the holiday," Singer says. "So the fixtures were initially installed as a temporary system because we just had to get them in. The next summer they were installed permanently. But Buzzy had a definite idea of the type of lighting he wanted, which helped to complete the job on time."

A PLACE TO PONDER

Singer says O'Keefe wanted the garden space to play a prominent role in luring customers.

"We wanted something that would look magical—a setting where the clientele could just sit, ponder, and have a drink. Or enjoy a relaxing dinner in the patio area," Singer says. "So by adding the colorful lamps, I was trying to add a fun, Disney-like element, which is really important to any restaurant, bar, nightclub, or even retail space."

Bowden Square is accented with naturally colorful trees like the Colorado Blue Spruce and Japanese Red Maple. Singer says he wanted to emphasize those hues with dichroic lamps.

"With the dichros, since the filters are within the lamps, and not serving as a lens, only a pure, true color is emitted. This offers any application a lot more punch, rather than just a diffusion of color."

To wash each tree and shrub, Singer specified flood fixtures to gain as wide a beamspread as possible. He used 150-watt PAR 38 dichroic floods to wash the maples with red and the spruce trees and shrubbery with blue. In areas, the blue and red beams blend to cast a purple glow. Singer employed a 90-watt very narrow spot to backlight the blue spruce for a moonlighting effect, adding an ethereal feel to the landscape. The spot fixture, like all the others, was ground-mounted at a 45-degree angle.

"This was kind of unusual because most moonlighting effects are done from within the tree itself," Singer says. "But this technique gave us the best washes, while filtering the light through all the branch layers. I used all of the trees as decorative elements. Instead of lighting them from within, I used them like they were part of a stage set."

The ground mounting also allows for easy maintenance, he says.

"This way people don't have to go climbing trees to replace lamps, which is difficult and can be dangerous," Singer says. "In many cases, the problem you have when you mount lights in trees is that after the initial installation, the fixtures will never be relamped. So you have a really beautiful landscape for six months and then it's history. Simple relamping procedures

"You want the lighting to be an unseen element. You don't want to see the sources—you want to see what the sources do."—Robert Singer

are crucial to any project."

Another reason the lamps are ground mounted is for aesthetics, Singer says, because this technique ensures that all electrical lines are buried cleanly and the fixtures are not as noticeable.

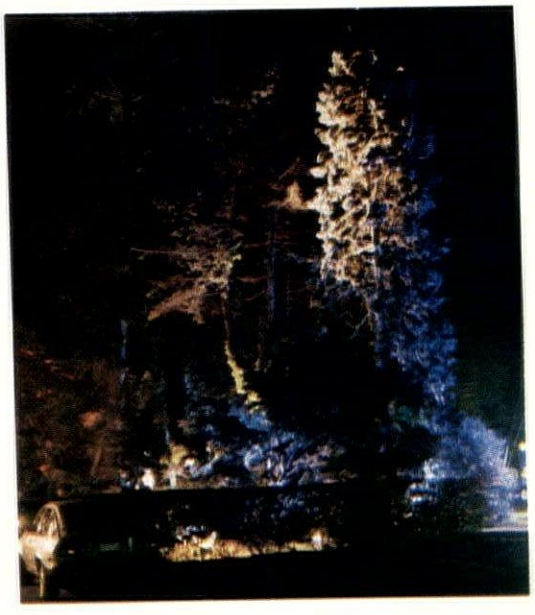
"You want the lighting to be an unseen element," he says. "You don't want the diners to see the fixtures or wiring going up a tree. You want to give the illusion that you're creating this magical place without the help of anything else. You don't want to see the sources—you want to see what the sources do."

TULIPS & MUSHROOMS

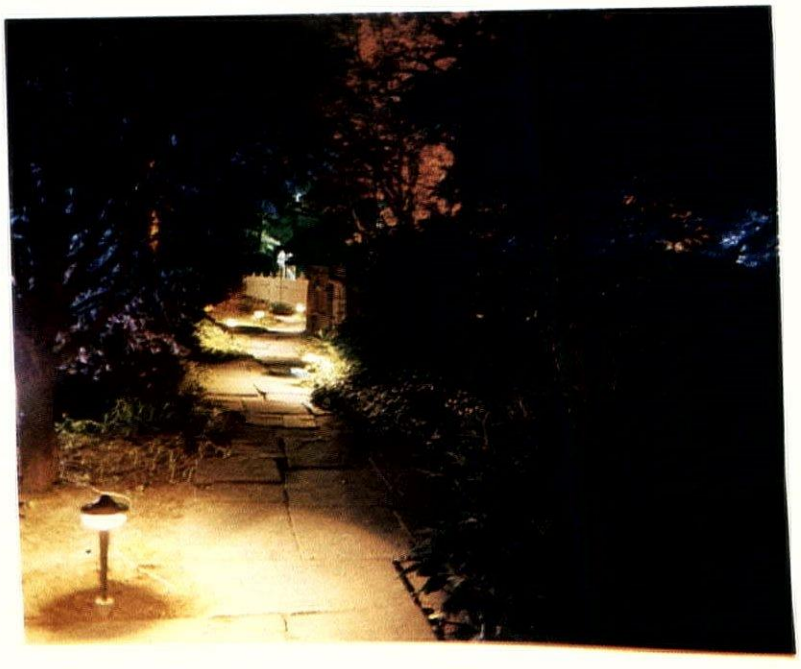
The decorative fixtures that line the garden area add to the landscape with their tulip and mushroom shapes. They house 40-watt A lamps that throw 6-foot pools of light in the patio area. The mushroom lamps are 12 feet on center, illuminating the pathways for patrons who want to explore the gardens and wander to the tavern at the other end of Bowden Square.

The main building and tavern exteriors are illuminated with incandescent washes from 150-watt PAR 38 lamps. Initially, Singer says, low-voltage sources were in place, but they didn't offer enough illumination to draw people in or make a statement.

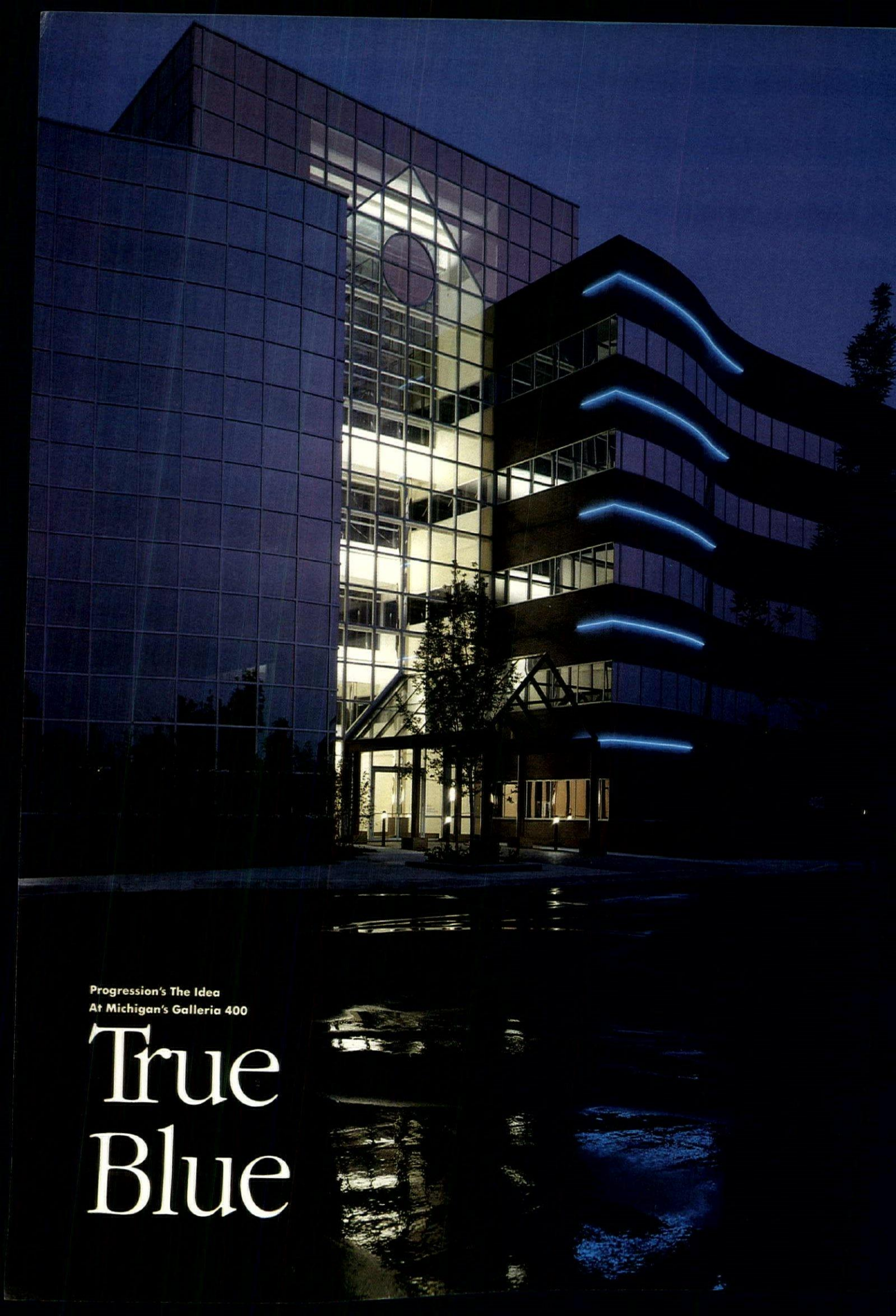
"I think the application is a successful one because visually it is very stimulating to passersby but, once inside, it's very soothing," Singer says. "We wanted to add this magical, intangible quality to make everything seem as if it's part of a fantasy. And it worked." ■



GARDEN PARTY: Decorative tulip and mushroom shaped fixtures generate 6-foot pools of light in the patio and pathway areas (above & below). The spruce tree's nighttime glow makes it a standout (right & opposite page).



DETAILS
PROJECT: *BOWDEN SQUARE*
LOCATION: *SOUTH HAMPTON, NY*
CLIENT: *MICHAEL "BUZZY" O'KEEFE*
LIGHTING DESIGNER: *ROBERT SINGER, ROBERT SINGER & ASSOCIATES, INC.*
LANDSCAPE ARCHITECT: *MICHAEL "BUZZY" O'KEEFE*
ELECTRICIAN: *ROBERT SINGER*
PHOTOGRAPHER: *ROBERT SINGER*
LIGHTING MANUFACTURER: *GENERAL ELECTRIC: 150-watt PAR 38 dichroic floods, 90-watt PAR 38 spot, 40-watt A lamps; KIM LIGHTING: spot and flood fixtures, tulip and mushroom decorative landscaping fixtures*



Progression's The Idea
At Michigan's Galleria 400

True Blue

INNOVATIVE DESIGN: Galleria 400's structural and lighting designs, with its stepped-out interior balconies and eye-catching cool blue accents, attract attention both day and night.

Cold cathode tubing mounted on Galleria 400's facade creates a bold and colorful statement

BY CHRISTINA LAMB
ASSISTANT EDITOR

The design of the contemporary Galleria 400, a five-story office building in Southfield, MI, attracts its own attention during the day with its curvilinear brick facade and glass curtainwall front. But at night, the building's innovative lighting is what turns the heads of passersby, says Jeff Brown of Gary Steffy Lighting Design Inc., Ann Arbor, MI. The progressive image the designers established with the architecture is conveyed with dramatic lighting effects—luminous blue tubes that stretch to ever-advancing lengths, and glowing interior balconies that ascend outward in progression.

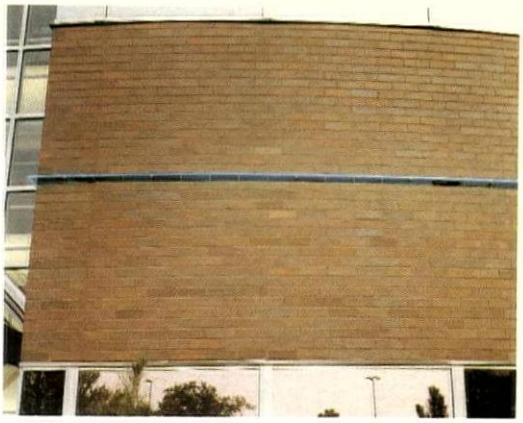
The advanced appearance of the building's facade was achieved with cold cathode tubing technology—clear glass tubing filled with argon and mercury, in this case. During daylight hours, the clear tubing, mounted on small sections of the blue brick band on each story of the building, is virtually undetectable. At night, however, the building's facade is accentuated with cool blue light when the tubing is energized. The crisp blue color, from the argon/mercury mixture, reinforces the accent brick that is visible during the day.

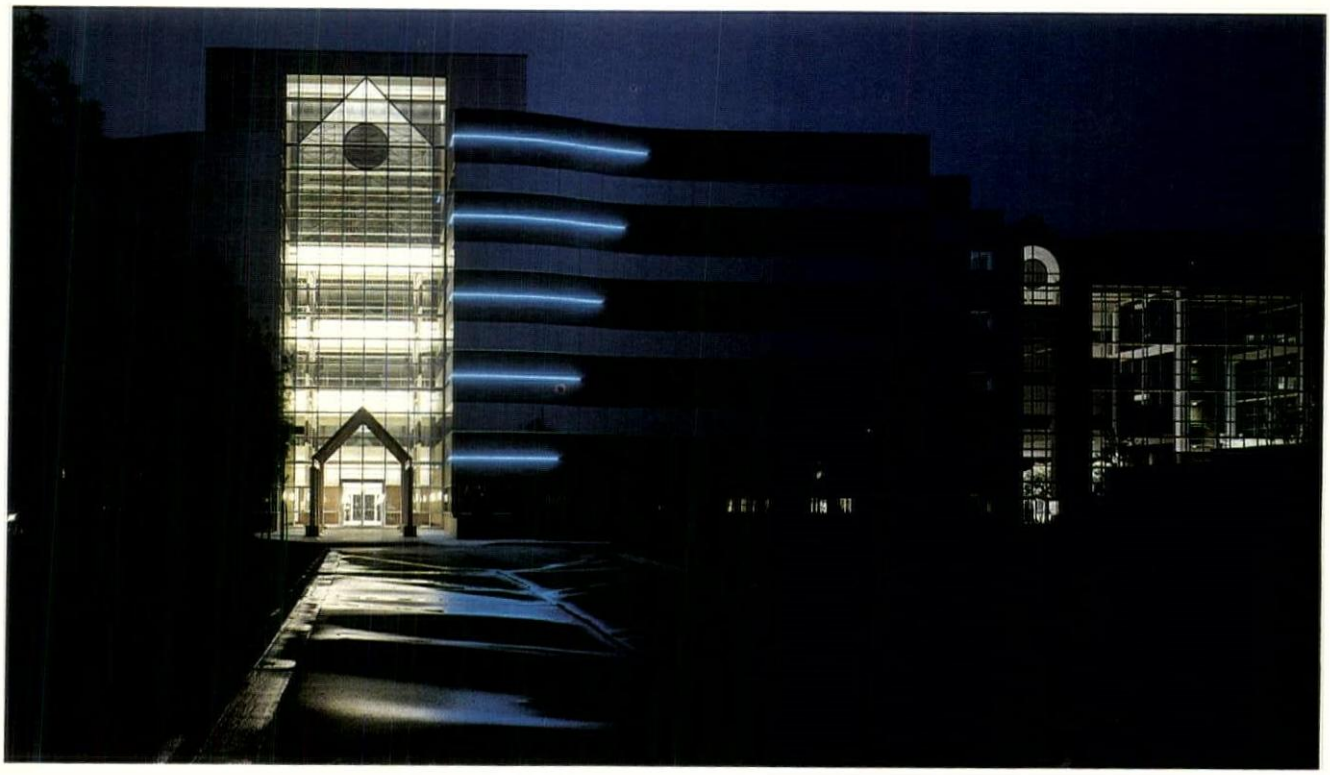
"Tubing filled with just mercury gas would produce a blue glow, whereas argon glows violet. The reason argon is added to the mercury is to help keep the lamp lighted in cold weather. The key to keep in mind is that mercury's starting capability in colder temperatures isn't good," Gary Steffy, principal designer for the project, explains.

"Neon gas is not affected by cold weather," Brown adds, so it would eliminate any starting problem, but would not have coordinated with the color scheme.

PHOTOS BY ROBERT EOVALDI

"We lighted the interior to make the atrium glow." —Steffy





GLOWING APPEARANCE: Bollards with "glow rings" and mercury vapor lamps (top left) mark the points of entry, and coordinate with the blue linear design on the building's facade (top right, above).

"It would start up, but would appear red. That's why we didn't use it," Steffy says.

Optimum nighttime visual impact is achieved by washing the interior atrium bulkheads and ceiling with fluorescent light. Economic and efficient, the fluorescent T8 and biax lamps highlight the interior vertical surfaces of the atrium.

The atrium space features four balconies that progressively step out toward the front curtainwall. At each of these 28-foot wide balconies, 9 extruded aluminum, T8 fluorescent lamps are placed in lensed-side fixtures with special reflectors. The luminaires are cantilevered 12 inches from each bulkhead and aimed at the surfaces.

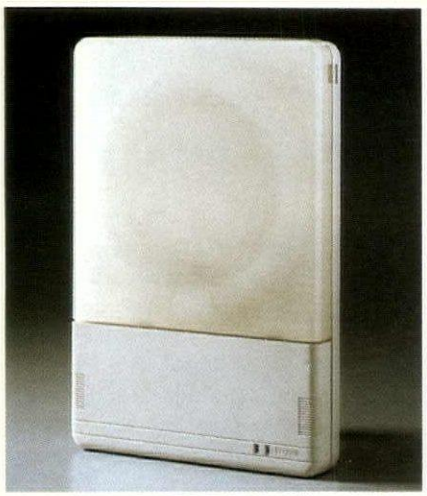
"Rather than trying to light the curtainwall from the exterior, we decided to light the interior surfaces so that the atrium would glow when viewed from outside the building," Brown says.

Low-level, low-glare, white louvered bollards, using 50-watt warm-tone mercury vapor lamps are used to provide lighting on the pathways and at the entries to the building. The 42-inch high bollards, with their blue-colored "glow rings"—blue plexiglass rings through which the light glows—also add visual appeal and unity to the site. ■

DETAILS

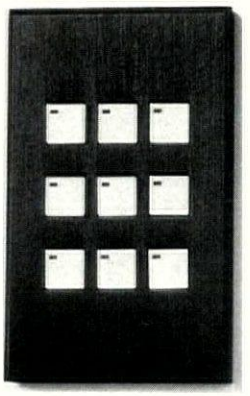
PROJECT: *GALLERIA 400 OFFICENTRE*
LOCATION: *SOUTHFIELD, MI*
CLIENT: *FCN ASSOCIATES*
ARCHITECT: *NEUMANN-SMITH ASSOCIATES*
LIGHTING DESIGNER: *GARY STEFFY, principal, AND JEFF BROWN, project manager, GARY STEFFY LIGHTING DESIGN INC.*
ELECTRICIAN: *GRAY ELECTRIC*
PHOTOGRAPHER: *ROBERT EOVALDI, ROBERT EOVALDI PHOTOGRAPHY*
LIGHTING MANUFACTURERS: *PEERLESS: extruded aluminum cantilevered T8 lamp luminaire side lenses and special reflector; VOLTARC: cold cathode tubing; GARDCO: louvered bollards; PHILIPS: 50-watt Styletone mercury vapor lamp; AMERICAN GLASS LIGHT: sconces with F39 biax lamp; LIGHTOLIER: Biax downlights*

PRODUCT ADVERTISEMENTS REVIEW



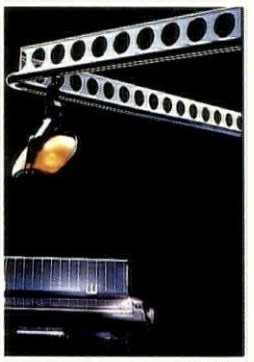
BEGHELLI PRACTICA BELLA

PRACTICA BELLA is a part of a complete line of lighting/emergency lighting products, and is available in black, white, and burgundy. The fixtures use 22-watt fluorescent lamps and feature a plug in connection system. Beghelli Inc., Jacksonville, FL. ***Circle 50***

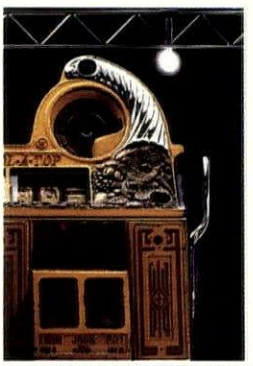


LITETOUCH 2000

LITETOUCH 2000 offers a total control system with a single microprocessor. The device not only switches light and motor loads on and off, but also allows full range dimming for incandescent, fluorescent, neon, cold cathode, and low-voltage loads as well. LiteTouch 2000 also offers many custom opportunities with features such as telephone interface, built-in time clock, unlimited preset capabilities, and random vacation mode. LiteTouch Inc., Salt Lake City. ***Circle 51***

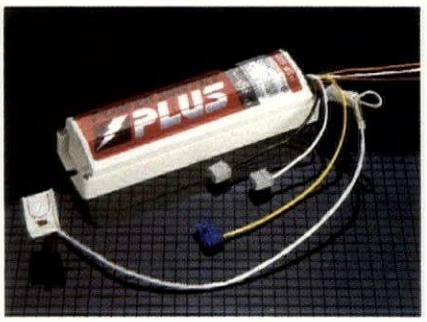


TARGETTI TOH

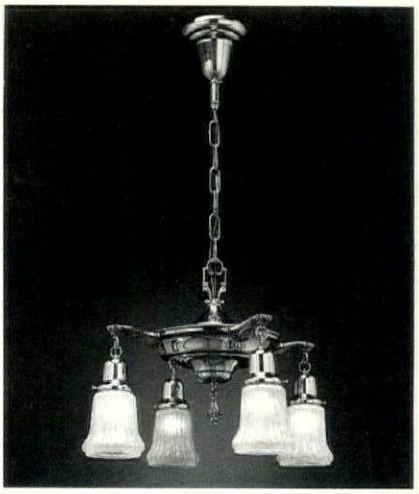


TARGETTI STRUCTURELLA

THE PSP500 POWER SENTRY PLUS is an emergency power battery pack that requires only five wiring connections. The pack fits into the fixture ballast channel, and installation is by the use of push-nuts, and insulation displacement connectors. The PSP500 activates automatically upon loss of normal utility power, and operates one 4-foot or shorter lamp in the emergency mode, providing light for a minimum of 90 minutes. The unit also features a one-piece test switch/pilot light. Lithonia Emergency Systems, Decatur, GA. ***Circle 52***



LITHONIA POWER SENTRY PLUS



REJUVENATION LAMP BROOKLYN

THE BROOKLYN, a four-arm colonial revival chandelier, measures 21 inches in diameter, 32 inches in length, and has a 5-inch ceiling canopy. The fixture is also available with two, three, or five arms. Rejuvenation Lamp & Fixture Co., Portland, OR. ***Circle 53***

LOW-VOLTAGE STRUCTURELLA system consists of miniature extruded aluminum three-dimensional frames that function as insulated electrical conductors as well as supports for its collection of miniature halogen spotlights. The system can be suspension or wall mounted and the halogen and dichroic spotlights interchange between Structurella and other Targetti low-voltage systems. Targetti, Inc., New York. ***Circle 54***

TOH, A LOW-VOLTAGE SPOTLIGHT, is the most recent addition to the Minitondo and Structurella systems. Accent lighting is achieved with special dichroic reflector and focus adjustability. Toh is available as a spot reflector with an 8-degree beam-spread, or a flood reflector with a 32-degree beamspread. The wireless low-voltage stem allows for orientation on a 95-degree vertical plane with unrestricted rotation on the horizontal plane. Targetti Inc., New York. ***Circle 55***

Tips On Using Specular Reflector Inserts

BY CHARLES LINN, AIA
EXECUTIVE EDITOR

The addition of specular reflectors to fluorescent light fixtures has been one of the most talked about methods of saving electrical energy in recent years. With energy costs what they are, firms specializing in these applications have done a land-office business over the past several years. Incredibily efficient reflector materials have appeared on the market, accompanied by fantastic claims of energy savings—and almost every utility company in the land has offered some sort of rebate for reflectors.

Certainly, you should not necessarily believe everything you hear about any product, but don't write off reflectors because some marketing claims are inflated. In the right situations, specular reflectors do work well and can save money.

How Inserts "Save" Energy

It is important to understand that the addition of reflectors to a fixture only increases the fixture's efficiency. Reflectors by themselves, obviously, do not save energy. By increasing fixture efficiency in a three-lamp fixture, one, and sometimes, two lamps can be removed. In a four-lamp fixture, at least one, and in some cases, two lamps can be removed.

After delamping, the remaining sockets are relocated within the fixture to optimize the effectiveness of the new specular reflector insert. By decreasing the amount of light that is trapped inside the fixture and turned to waste heat, the new reflector compensates for the lamps that have been removed. The specular reflector does a better job of boosting light from the remaining lamps, than some fixtures' original white-painted surfaces.

To realize the maximum energy reduction benefits possible from the delamping and installation of energy efficient components, the fixtures' original lamps and ballasts should be replaced with new energy efficient models. Because fixtures must be delamped and disassembled in order for the reflector inserts to be installed, this is an ideal time to do the job.

Older offices, hospitals, schools, stores—and especially overlit buildings designed during the "more light, better sight" era—may be good candidates for specular reflector retrofits.

Retrofit Reflector Materials

Much is made of the reflectivity of specular reflector materials. Reflectivity is expressed as a percentage and is determined by measuring the quantity of light reflecting off the material, divided by the quantity of light measured before reflection. If a perfect reflector material existed, it would have a total reflectivity of 100 percent. By comparison, silver film has a total reflectivity of about 95 percent. Naturally, the higher a material's total reflectivity, the more light it reflects, and the more efficient it is when used as a reflector.

Durability is another important consideration. Because reflector materials must resist heat and ultraviolet radiation emitted by the fluorescent lamps, as well as an occasional thorough cleaning, it is critical that the material be durable and abrasion-resistant. Any material that punctures, scratches easily, delaminates over time, or becomes discolored by cleaning solutions, will eventually be rendered useless as a reflector material.

There are four types of specular reflector material: silver film, enhanced aluminum, anodized aluminum, and aluminum film (see sidebar).

Reflector Design

Even the best reflector material will do little if the reflector design is poor. Some inexpensive fluorescent fixtures have either no reflector at all, or only a bent piece of white-painted sheet metal. Although a clean, white-painted sheet metal reflector is arguably almost as reflective as specular material, light diffuses when it strikes a white surface. This makes a white-painted reflector far less effective than specular material in accurately controlling the light so it can be distributed beneath the fixture. As much as 30-40 percent of the available light can be trapped inside a fixture with a poorly designed reflector. This wasted, unusable light turns to heat, which not only shortens the life of the lamps and ballast, but also adds to a building's air conditioning load.

The specular reflector insert used to replace the white-painted metal reflector starts out as a flat sheet of material, that is bent into a complex, computer-designed shape. Ob-

Specular Reflector Materials

SILVER FILM. This material consists of polyester film metallized with pure silver, bonded to a sheet metal substrate. Silver film has a total reflectivity of about 95 percent.

ENHANCED ALUMINUM. This material is similar to anodized aluminum, except that it is plated with metal rare earth materials. Enhanced aluminum is as abrasion-resistant as conventional anodized aluminum, but has a higher degree of reflectivity. Enhanced aluminum has a total reflectivity of about 94 percent.

The addition of reflectors to fixtures increases the fixtures' efficiency. Overlit buildings designed during the "more light, better sight" era are good candidates for specular reflector retrofits.

viously, the design of the reflector shape is critical because, combined with the reflectivity of the material, it ultimately determines how efficient the fixture will be. This design is usually the responsibility of the reflector fabricator, who may either have a number of stock designs on hand or will develop a custom design specifically for each application.

The reflector designer should consider all aspects of each existing lighting system individually, including the height and spacing of the fixtures, and the internal dimensions of the existing fixture housing. Together, these factors have a bearing on how many lamps can be removed from each fixture, the new photometric distribution of the fixture, and how uniform the lighting in the space will be once the new reflectors are installed.

Reputable reflector manufacturers always provide photometric test reports that have been prepared by an independent test laboratory. Examination of these reports in the context of height and spacing of existing light fixtures is critical to ensure that the reflector design proposed for a facility will light the space uniformly, and provide sufficient light.

MAINTENANCE

Claims that two lamps with a reflector will put out the same amount of light as an existing four-lamp fixture generally compare an aged fixture with depreciated lamps and a discolored reflector and lens to a fixture fitted with a new specular reflector, new lens, and two new lamps. This is obviously an unfair comparison, but it does teach us an important lesson: some older lighting systems were so overdesigned that they could deteriorate for years with nobody noticing the difference.

A maintenance program that keeps light fixtures cleaned and group-relamped occasionally becomes much more critical once reflectors—or any type of energy-efficient lighting fixtures—have been installed, because this massive overdesign factor has largely been eliminated. Lighting systems that are not routinely maintained soon leave their users in the dark.

CHOOSING A VENDOR

Specular reflector manufacturing requires sophisticated computer programs for reflector design, precise metal forming capabilities, and experienced installers. Generally, it is best to hire an experienced vendor who specializes in specular reflector retrofitting for the job. Choose an established vendor with a successful track record, who is still likely to be in business when the warranty period expires. Be sure to check references.

It is also important to determine how much the quality of the lighting will change as a result of being retrofitted with specular reflectors. It is always a good idea to ask the reflector vendor to mock-up a portion of the new system on site, and have your client try it out for a few weeks before committing to the work. Be sure to view the mock-up with these factors in mind:

- Does the new system increase or decrease glare?
- Is the lighting relatively uniform, or does it drop off dramatically between fixtures? If so, does this pose a problem?
- Is there enough light to work comfortably? If there is barely enough light now, there certainly won't be enough in a couple of years when the fixtures need cleaning and relamping.
- Does the material stand up to a thorough cleaning?

If a mock-up is not possible, visit other buildings that the vendor has completed with these questions in mind.

RETROFIT COSTS

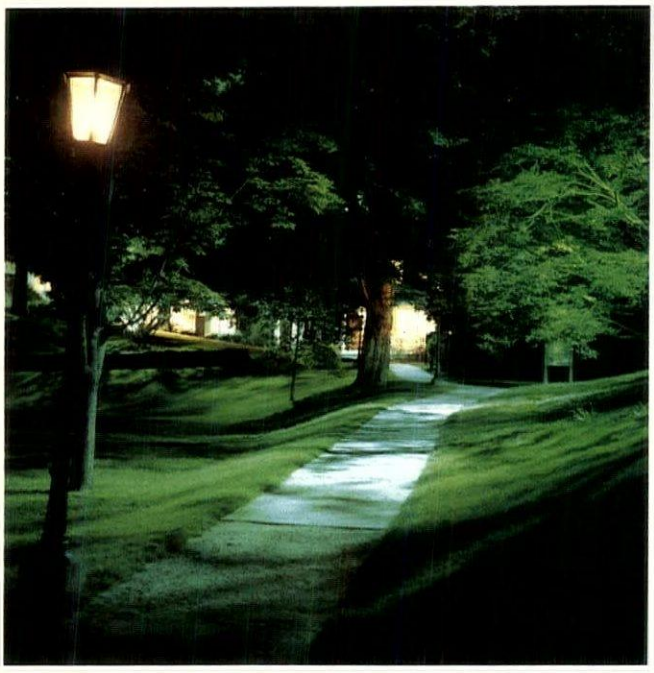
Despite its seeming simplicity, retrofitting fluorescent fixtures with specular reflector inserts is not inexpensive. In fact, some lighting consultants argue that the cost of new fixtures is competitive with retrofitting old fixtures with new reflectors, ballasts, and lamps. This may especially be true if the fixtures are to be recircuited to accommodate tandem ballasting, step-dimming, or some other lighting control strategy.

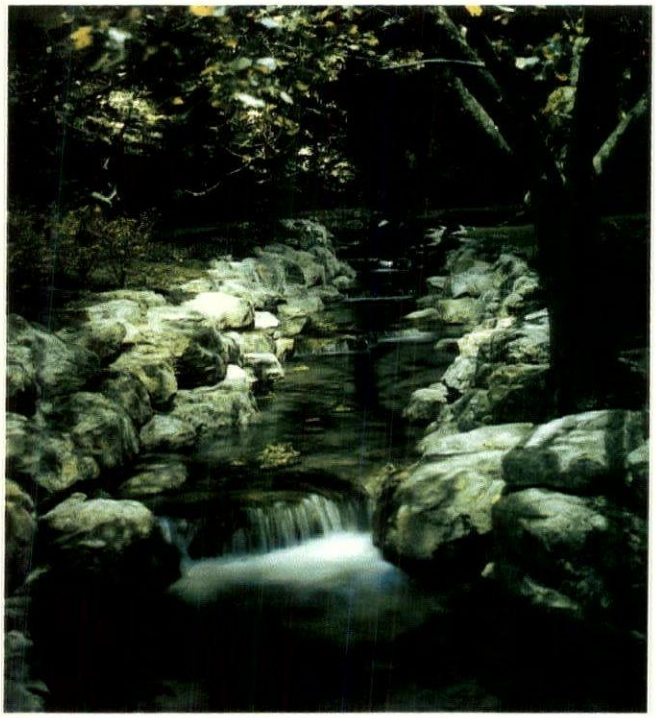
Specular reflector inserts can help save energy in some situations, but like any lighting product, they are not the universal answer to every lighting problem. They should be chosen with care after all the alternatives have been examined. ■

ANODIZED ALUMINUM. Anodizing deposits a transparent coating of aluminum oxide onto the surface of aluminum sheet. When specular aluminum sheeting is anodized, it becomes resistant to abrasion due to cleaning. Anodized aluminum has a total reflectivity of about 87 percent.

ALUMINUM FILM. This material consists of aluminum particles laminated to polyester film, which is bonded to a sheet metal substrate. Aluminum film has a total reflectivity of about 88 percent.

Magic By Moonlight





PARKING LOTS (top) for the restaurant of the Homestead Hotel in Virginia are in a heavily wooded area. Tree-mounted fixtures, in addition to lampposts, provide effective security lighting. (Above) The darkness of the pond at the Homestead is in striking contrast to the edges of the banks that are lighted from tree-mounted fixtures.

BY BETH ELLYN ROSENTHAL

The author is manager of public relations for John Watson Landscape Illumination Inc., Dallas.

At night the cacophony of sights grows silent in the blackness. By highlighting specific areas in the landscape, a lighting designer can coax beauty out of a dark environment with great success. In fact, a talented lighting designer is much like a painter who transforms a black canvas into a work of art using light and shadow.

NOT ALL PALMS LOOK ALIKE

The landscape illuminator must have an essential knowledge of native plants to create an artistic design that will weather like an oil painting instead of a pen and ink drawing on paper. Growth patterns of the plants are a critical consideration. The landscape designer must envision a plan that will still express the same message when the tree doubles in size.

An experienced designer can create a landscape illumination plan that will look stunning when the trees are lush with greenery as well as when they are stark and snowy. Pruning techniques ensure the integrity of the design regardless of the season.

MAINTENANCE IS A MAJOR FACTOR

Retaining the sculpture of the landscape and maintaining the working parts of the lighting equipment are the key considerations in the long-term enjoyment of a landscape illumination system. These maintenance issues should be paramount when designing a system.

Since landscape illumination systems are affixed to growing surfaces, they need to be checked every six months by a trained professional. Often times the fixtures need to be replated so they don't damage the trees. Vibration from growth can also cause fixtures to loosen, and make the light shine in the wrong spot.

Pruning is essential to ensure the original design remains intact. Clients pay for the designer's creativity and insight. That design could disappear in a year if they do not prune their trees periodically.

SHARE YOUR PHILOSOPHY WITH THE CLIENT

The designer should share his design thoughts with the client so the client is familiar with the philosophy behind each light's placement. This will help the clients and their gardeners properly care for the system and the landscape it illuminates.

We always train the clients and their staffs how to properly care for our lighting system. However, we encounter problems when one gardener leaves and another takes his place. Frequently the new gardener is unaware of the system's

Nothing is worse than a blinding light directed straight into a viewer's eyes. Shields are required to direct the light from the trees to the ground.

maintenance requirements. If the client doesn't train him, we must if the design is to remain sharp.

DEALING WITH CHANGE

If the designer has carefully thought out his landscape illumination plan, there is little reason to rearrange the lighting system outside the required maintenance.

But a maturing landscape can require some significant additions if the designer penned the plans when the trees were young. Mature trees are capable of heightened drama.

Advancements in technology can also dictate a major change in a client's landscape lighting needs. Advancements include new fixtures that require less maintenance or are cheaper to operate.

THE EFFECTIVE USE OF COLOR

Like an artist, a landscape illuminator has an unlimited palette of hues to choose from. Clients can enhance the enchantment of their lighting systems by accommodating their planting plans to the evening moonlighting effects. Under the cool glow of gas discharge lamps, red and deep pink colored flowers become an intense deep purple. Although the color is regal, it is difficult to see in the dark.

Light colored plants are richly enhanced by landscape lighting. Clients should plant flowers with white, yellow, or pale pink blooms. White caladiums, for example, look like meringue icing under these lights.

SHIELDS ARE A MUST

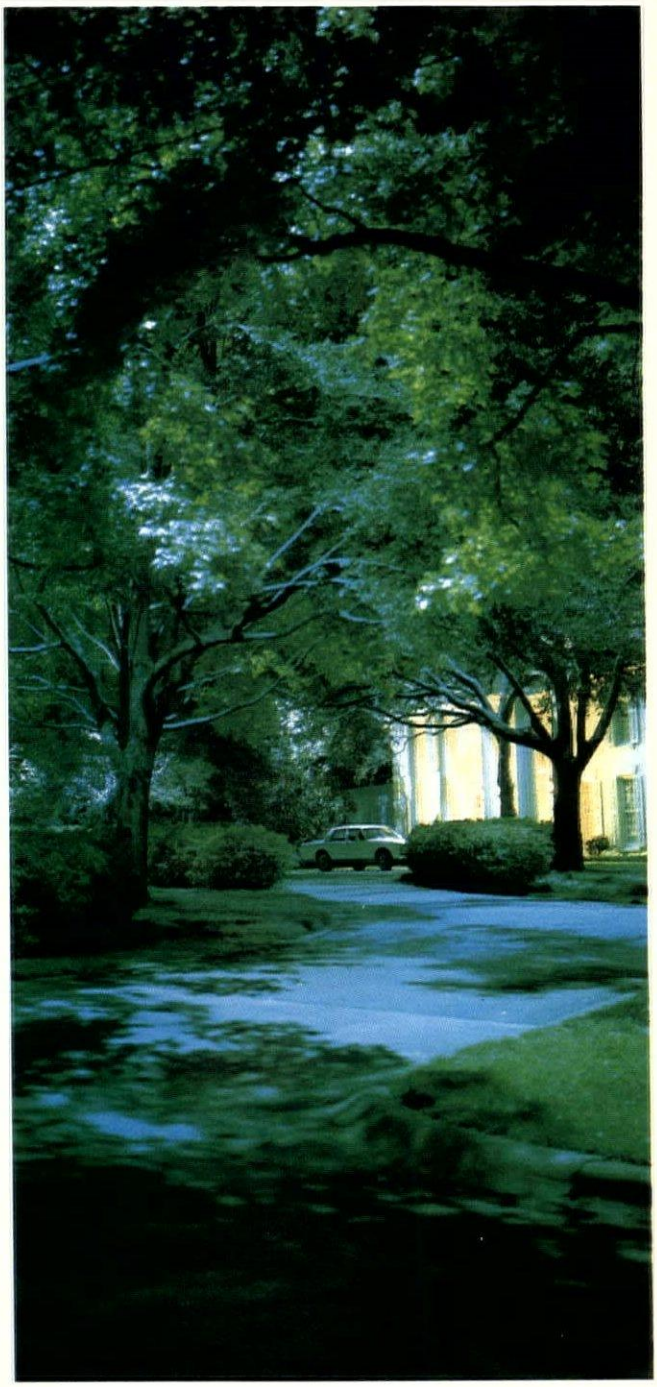
Nothing is worse than a blinding light directed straight into a viewer's eyes. Shields are required to direct the light from the trees to the ground. The ability to control glare adds an artistic element to any lighting design.

A designer will work hard to conceal the fixtures to make the lighting design mirror actual moonlight. Placing them unobtrusively in a tree or burying them in the ground provides a more natural look. Also, fixtures can be painted to match the locations in which they are mounted, whether in trees or on building structures.

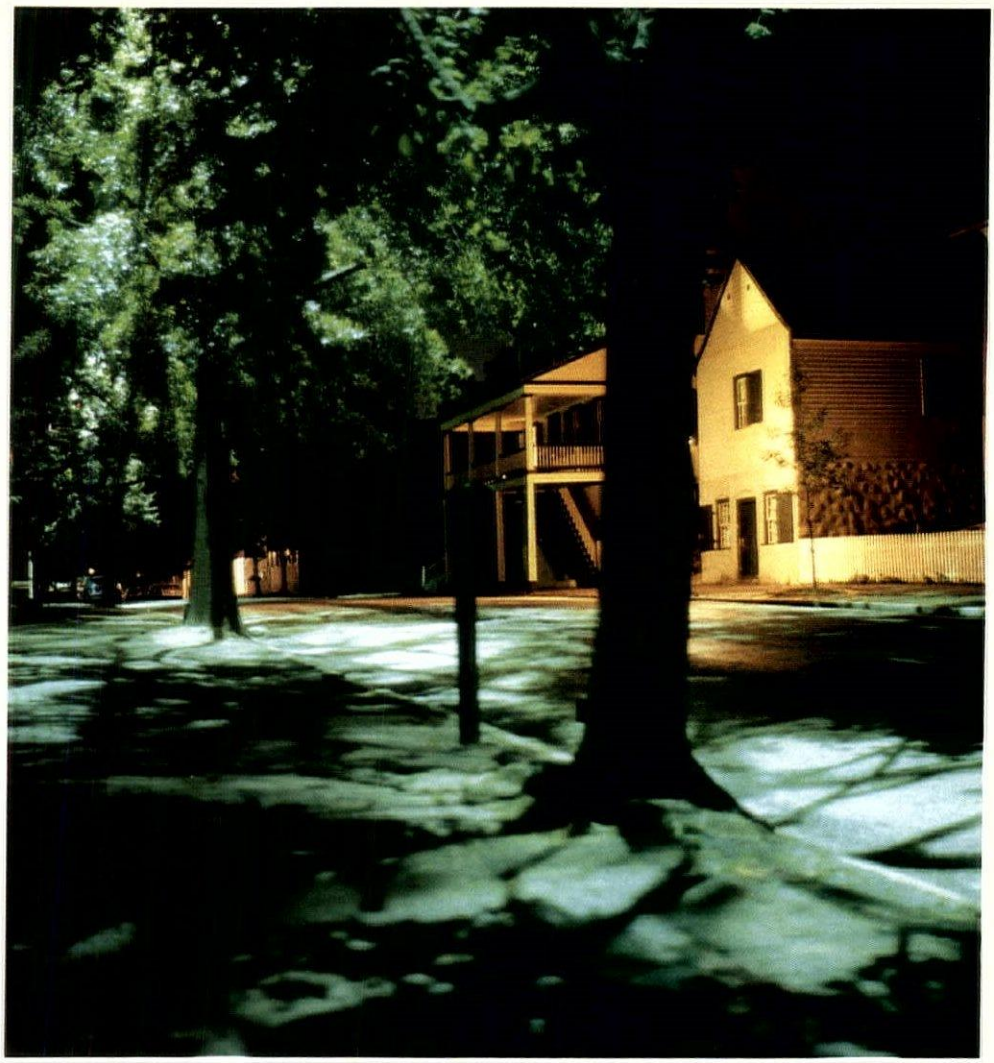
RESIDENTIAL VS. COMMERCIAL CONCERNS

While the design process is the same regardless of the assignment, the importance of the different pieces of the puzzle change. On a residential job, the client's personality should shine through the design.

Commercial clients are attempting to maximize their investments. In the winter months, country clubs and resorts can extend their hours and add traffic to the dining room and bars by installing a lighting system. Hotels can increase security and reduce their liability without sacrificing aesthetics by illuminating driveways, entrances and parking lots. City parks have found landscape illumination systems reduce vandalism and encourage use after sundown.



THIS PRIVATE HOME is located in an exclusive, wooded area of Dallas. The grounds have been illuminated to provide enough visibility to deter thieves, as well as an attractive ambiance pleasing to guests. Blue and green filters on fixtures enhance the vibrant, healthy look of the landscape. All the fixtures are on different circuits, so if one line is snipped, the other fixtures remain lighted.



OLD SALEM is a historic, 17th century restoration in Winston-Salem, NC. Though it is only open to the public for touring by day, lighting has been added to create a romantic and safe walk-through by night for out-of-town visitors. Tree-mounted downlights create a "moonlight" effect, dappling the ground with random leaf patterns.

Commercial building owners, more than homeowners, demand a design that is strong and dramatic, since it must instantly capture the attention of the casual passerby. Also, commercial property owners require less maintenance than a proud homeowner since they want to protect their net operating income.

MAKE CONTROLS EASY TO USE

Too often designers make controls a lot more complex than they need to be. They need to be intuitively obvious to the user, who generally does not have an electrical engineering degree.

Technology has invaded the light control industry. Breakthroughs have given lighting designers a tremendous opportunity to be creative.

For residential use, a simple location for the primary controller with a secondary unit in the master bedroom is recommended. For security reasons, electric eyes can control certain portions of the design. Other areas, depending on their role in the design, need to be manually switched.

Commercial jobs require both automatic controls on electric eyes and time clocks to keep down labor costs.

A WEALTH OF EQUIPMENT CHOICES

There has never been a time in the history of outdoor lighting when there has been a wider selection of exciting lighting equipment available for the lighting designer. Today his/her palette is particularly full.

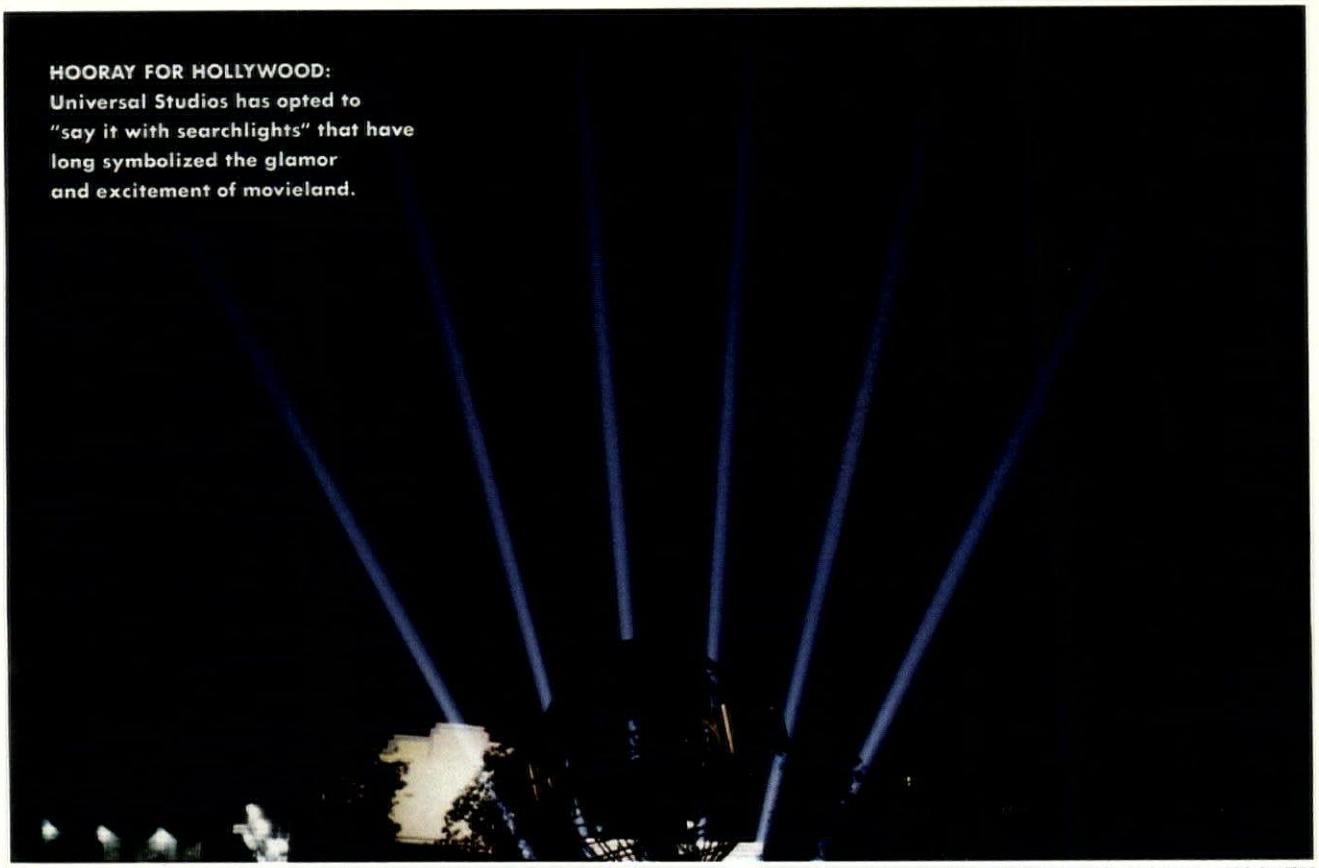
Determining the client's expectations is the chief consideration in choosing the appropriate equipment. The same yard will look totally different if one designer proposes a sophisticated plan while another wants a flashy, party atmosphere. Designers have to work backward from the end effect.

SECURITY LIGHT CAN BE BEAUTIFUL

There's no reason why a home needs to be illuminated like a baseball field to keep the evil doers away. Beautiful lighting can be directed to dark spots in the environment to force a burglar to ply his/her trade in the open. Carefully placed lights at doors, windows, and the property's perimeter can cast a warm glow around the house while increasing the property's security.

We always place the security lights on separate circuits. If a burglar tries to cut the electricity to the lights, he or she will have to determine which of several circuits to dismantle. ■

Creating Columns Of Light— Xenon-Arc Searchlights



HOORAY FOR HOLLYWOOD: Universal Studios has opted to "say it with searchlights" that have long symbolized the glamor and excitement of movieland.

PHOTO COURTESY OF L.P. ASSOCIATES

BY BARRY DURON

The author is director of marketing of L.P. Associates, Inc., Hollywood, CA.

Long, straight beams of white light piercing infinite darkness. This is the strong visual impact produced by xenon arc searchlights, which have been used successfully by architects and lighting designers to enhance, single out, and attract attention to buildings, monuments, fountains, outdoor sculpture, and other works of art.

Xenon-arc searchlights were developed initially for military and aerospace applications (see sidebar on page 43 for details on carbon arc searchlights).

The special properties of the xenon arc lamp, however, have made them accessible and commercially attractive for "civilian" use in the advertising, entertainment, and architectural fields. These properties are: high intensity, point source, white (solar spectrum) light, color stability, long life, cleanliness, ease of maintenance, and dependability.

The two essential ingredients necessary to form a visible column of light are:

1. a luminaire that emits light in a *collimated* (parallel, non-divergent), and sharply defined beam—a searchlight;
2. the presence of small particles in the light path, such as moisture, dust, and other airborne particles, which reflect and scatter the light.

To fulfill its purpose of creating a strong visual impact, the light beam has to be sharply defined, and sufficiently long and bright to be seen from great distances. The beam quality is affected by several factors, of which the most important are:

- atmospheric conditions
- the location of the observer
- searchlight design

Generally speaking, however, a well designed searchlight will produce, under favorable atmospheric conditions, a

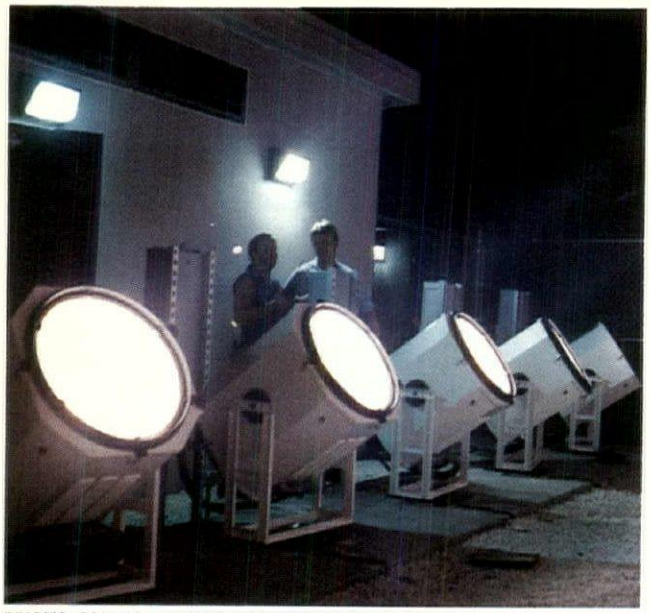


PHOTO COURTESY OF L.P. ASSOCIATES

MORE HOLLYWOOD: (Above and below) Ground-mounted searchlights are used to illuminate the Universal Studios globe shown on the preceding page. Searchlight beams have been used for decades as attention-getters for monuments, fountains, and sculpture. Recently, permanent architectural installations have been on the rise (see sidebar on page 41).

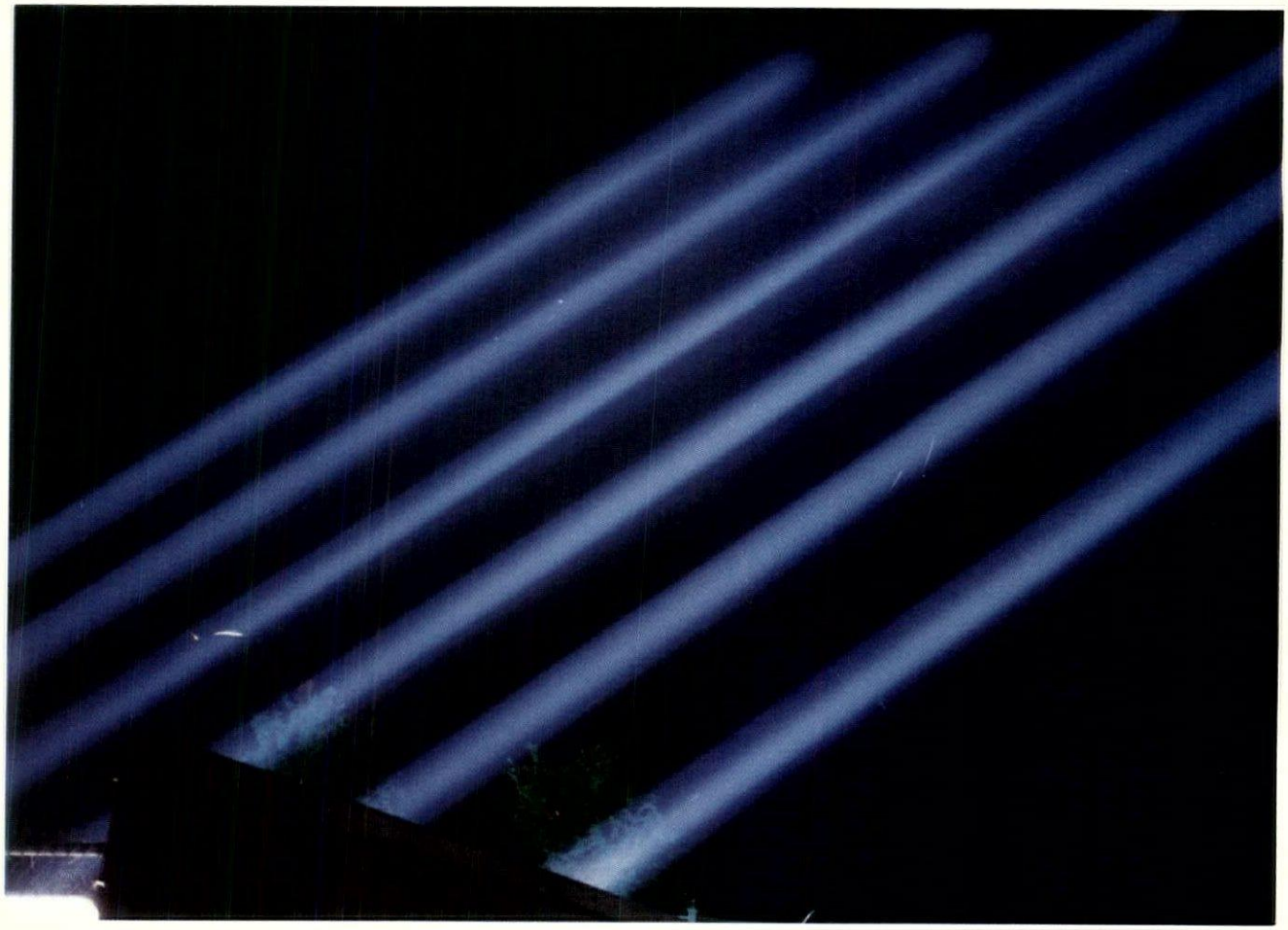
beam that is several miles in length and is visible from a distance of more than 10 miles.

ATMOSPHERIC CONDITIONS

Obviously, since the visible beam consists of light reflected by airborne particles, the higher the concentration of these particles, the more visible the beam. For the purpose of creating a good, visible beam, the best conditions are found on a clear night in urban, commercial, and suburban environments, under moderate temperature and humidity. Under these conditions, a good searchlight, with a collimation angle of 2 degrees or better and beam diameter of about 20 inches, and a 2,000-watt xenon lamp, will be seen very clearly (effective range) from a distance of at least two miles, and can be noticed (visible range) from as far away as five miles. With a 4000-watt xenon lamp, the effective range can exceed five miles, and the visible range can go up to 10 miles or so.

In clean, dry desert air, or in the dry, cold air prevailing in the northern midwest of the U.S., these distances could be halved. Conversely, in fog, smog, or haze there are enough particles in the air to produce a bright beam, but it may become completely lost several hundred feet from the searchlight. In an absorbing medium, such as hazy air, light is attenuated exponentially with distance. In other words, if half the light was absorbed in the first 100 feet, then the next 100 feet will absorb half of what's left, and so on. At 300 feet from the searchlight, the beam would be down to one eighth of its original brightness; for all practical purposes, it is invisible.

PHOTO COURTESY OF L.P. ASSOCIATES



Both the length of the beam and its visibility depend on the degree of collimation the searchlight can achieve, which, in turn, depends on the precision of the reflector and the size of the light source.

OBSERVER LOCATION

At any given time, the same beam of light may appear differently when seen from different locations. Both the apparent brightness of beam and its apparent length depend on two factors: the ambient light around the observer, and the angle of viewing.

The ambient light around the beam itself has very little effect when the beam is viewed from a considerable distance. A light beam produced by a good xenon arc searchlight towers over any other source of light, and while the bottom 10, or even 100 feet, can get lost in the strong ambient light, the rest of the beam, which is miles long, can still be seen very clearly.

When the observer, however, is subject to strong ambient light, the pupils of the eyes can contract enough to erase all traces of the light beam. The effect is so pronounced that there are cases in which an observer outside the well-lit lobby of a building with a searchlight on its roof may see no beam, while another person, 100 feet away at the back of the building, marvels at the spectacular column of light. For that reason, searchlights operating in well-lit urban areas are more effective in attracting the attention of people from several blocks to several miles away, than of those in the immediate vicinity.

The viewing angle of a collimated light beam affects both the brightness and the apparent length of the beam. When small airborne particles scatter light, the light is spread most strongly in the "forward scatter" direction—the direction of the beam. Back scatter—light scattered back toward the source—is somewhat weaker. Light scattered at a direction perpendicular to the beam is weakest.

As a result, the beam appears brightest when it is close to horizontal and pointed toward the observer, over the observer's head. A beam viewed at 90 degrees appears less bright.

A beam that is sighted along its length from the vicinity of the searchlight is viewed in the back scatter mode and is almost as bright as an overhead beam seen in forward scatter. However, its apparent length may be very short.

The reason is the critical angle—the angle below which

EVOKING TIMES PAST WITH TODAY'S TECHNOLOGY

TWO PRONGS OF LIGHT reach straight up to the sky from the top of NCNB (North Carolina National Bank of Florida) Plaza located in Tampa. The building's circular design is meant to be more than an example of clean-lined contemporary architecture.

"The building symbolizes a beacon. The circular structure is reminiscent of forms of the past—lighthouses on the waterfront," says Robert Kellner, principal in charge of the project for Odell Associates, the construction architects.

Two 7 kilowatt xenon searchlights on the building's roof drive home the "beacon" message.

"The searchlights complete the concept of the building and allow the form to merge with its symbolic meaning," Kellner says.

The design architect for NCNB Plaza was Harry Wolfe, Wolfe Associates. The construction architect was Odell Associates, with Robert Kellner as principal in charge, and Steve Thomas as project manager. The lighting designer was Jules Fisher & Paul Marantz, Inc. The project owner is Equitable Real Estate, and the building is managed by Faison and Associates.

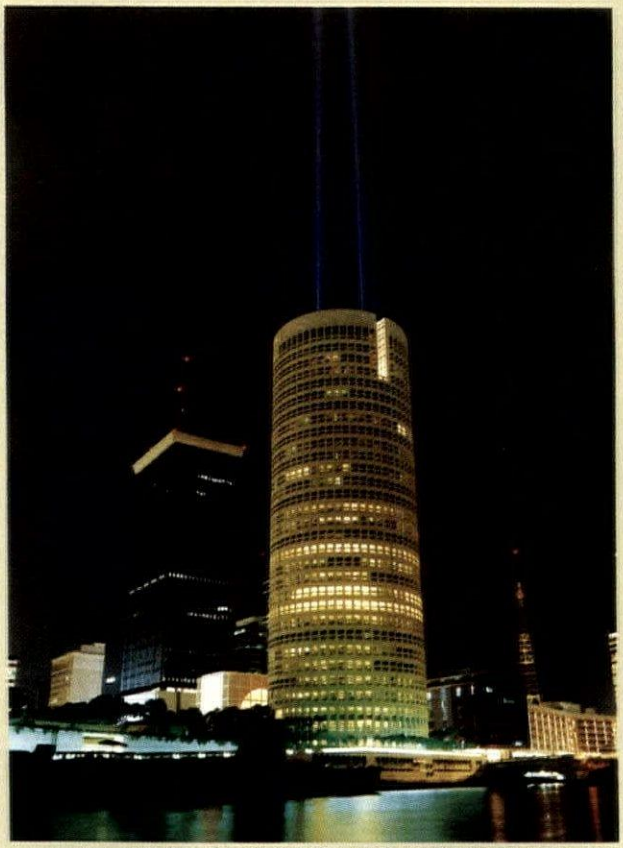


PHOTO COURTESY OF SKY-TRACKER OF AMERICA, INC.

back scatter cannot be seen. Light scattered back toward the searchlight is cut abruptly when the angle between the beam and the line-of-sight is sharper than ca. 5 degrees.

An observer standing close to a collimated beam pointing straight up will see the imaginary end of the beam at an angle of 5 degrees to the beam direction, or 85 degrees to the horizon (see Figure 1). He will see a very short, albeit bright, beam.

As the observer goes farther away from the base of the beam, the visible end of the beam is still located at a line of sight of 85 degrees of the horizon (see Figure 2). The beam appears longer as the distance of the observer increases. At a distance of about one mile away, the full length of the beam can be appreciated.

SEARCHLIGHT DESIGN

Both the length of the beam and its visibility depend on the degree of collimation the searchlight can achieve. And that degree of collimation, in turn, depends on the precision of the reflector and the size of the light source.

In theory, any paraboloidal reflector (i.e., a reflector whose cross-section is a parabola) will reflect all light emanating from its focal point in a collimated beam. However, to be suitable for use in a searchlight, the reflector ought to be deep enough to collect a substantial portion of the light produced by the lamp (see Figure 3), and its curvature precise enough

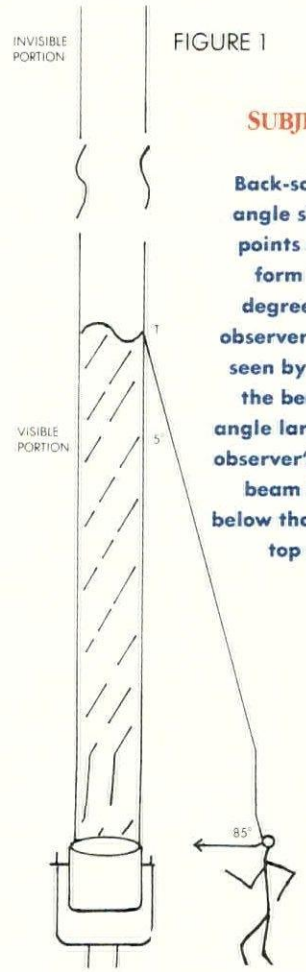


FIGURE 1

SUBJECTIVE BEAM HEIGHT

Back-scatter cannot be seen at an angle sharper than 5 degrees. All points of the beam above point T form an angle smaller than 5 degrees with the line of sight of observer A, and therefore cannot be seen by this observer. All points of the beam below point T form an angle larger than 5 degrees with the observer's line of sight. Therefore the beam is visible to this observer below that point. Observer A sees the top of the beam at point T.

to create a sharp, well defined beam. Although glass can be ground and polished to a very high level of precision, it is very difficult and costly to form deep-dish glass reflectors.

Metal reflectors, on the other hand, can be made sufficiently deep to collect most, or all, of the light emitted by the source. However, most conventional processes of metal forming (casting, spinning, machining) cannot produce the required surface accuracy. The best manufacturing process that can produce satisfactory searchlight reflectors, with precision exceeding one-hundredth-of-one-degree surface accuracy, is the process of electroforming. In this process, a shaped metal object is made by electrochemical deposition of the metal on a reusable, high-precision mold, known as master.

The presence of a good, precise, electroformed reflector, coated with a highly reflective protective coating to prevent deterioration of the surface, is still not enough to guarantee a sharp, collimated light beam. Another necessary ingredient is a lamp having a very small light source.

As mentioned earlier, a paraboloidal reflector will reflect all light emanating from its *focal point* in a collimated beam. In reality, light source, however, is not a point. It has finite dimensions. And the larger it is, the more divergent is the light beam (see Figure 4).

Xenon arc lamps, used in today's searchlights, produce light from a gap between two electrodes that are several millimeters (from 0.5 to 5 mm = 0.02 inch to 0.2 inch) apart.

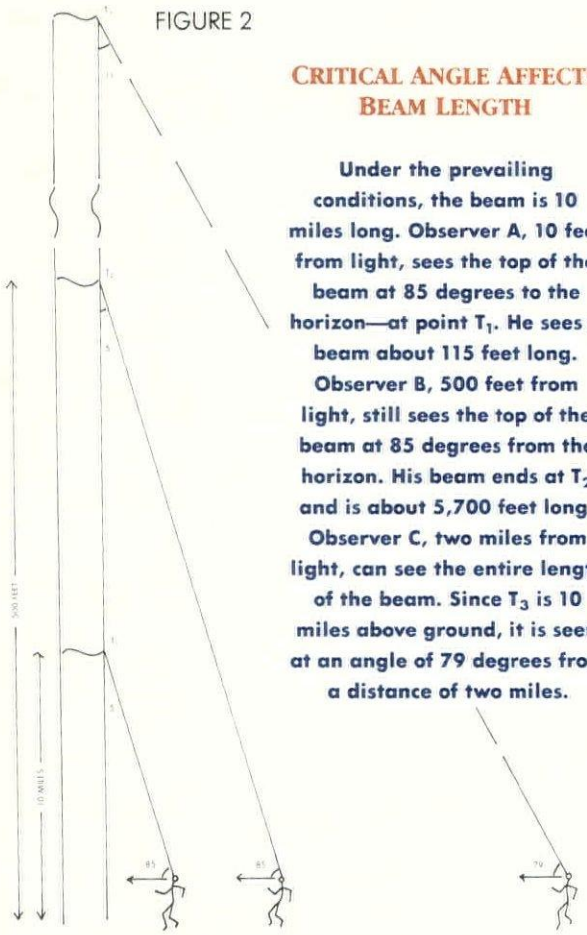
XENON'S PREDECESSOR—CARBON-ARC SEARCHLIGHT

LONG, BRIGHT COLUMNS OF LIGHT have long been used to create special visual effects, to generate excitement and to attract crowds. Carbon-arc searchlights, manufactured during World-War II for air defense, are still in use today to attract the public's attention to special events, grand openings, sales, and celebrations.

Although these ancient searchlights are adequate for short-term use, they are not suitable for use as permanent fixtures. They need constant attention: the carbon electrodes need changing every few hours, and the reflector needs frequent, periodical cleaning of the soot deposited on it by the hot carbons. They require the presence of a full-time, dedicated operator. They cannot operate for any length of time while pointing sraight up. And their power consumption is very high, in the range of 10,000 to 15,000 watts.

These problems were solved by the development, in the late 1960s and early 1970s, of the xenon arc searchlight.

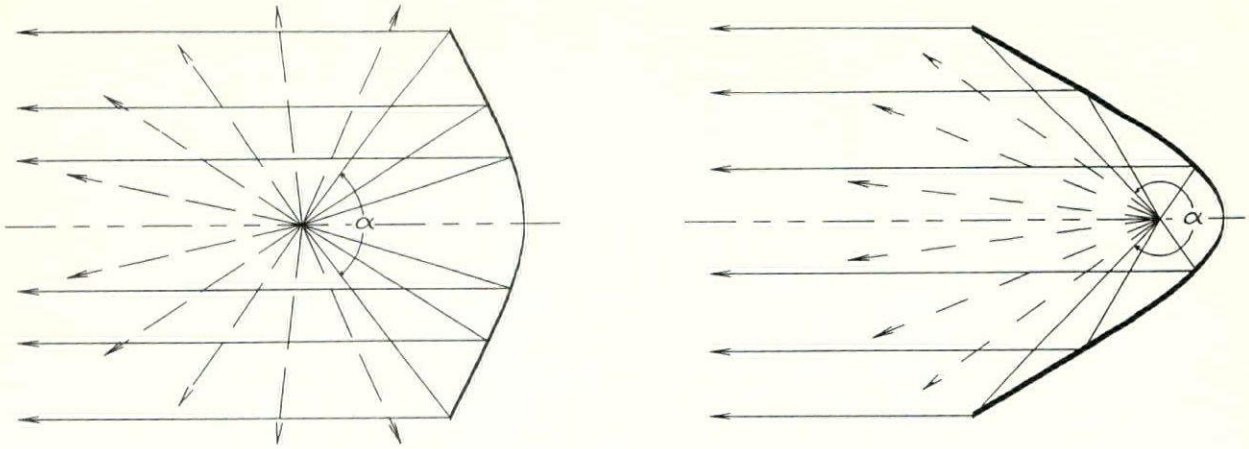
FIGURE 2



CRITICAL ANGLE AFFECTS BEAM LENGTH

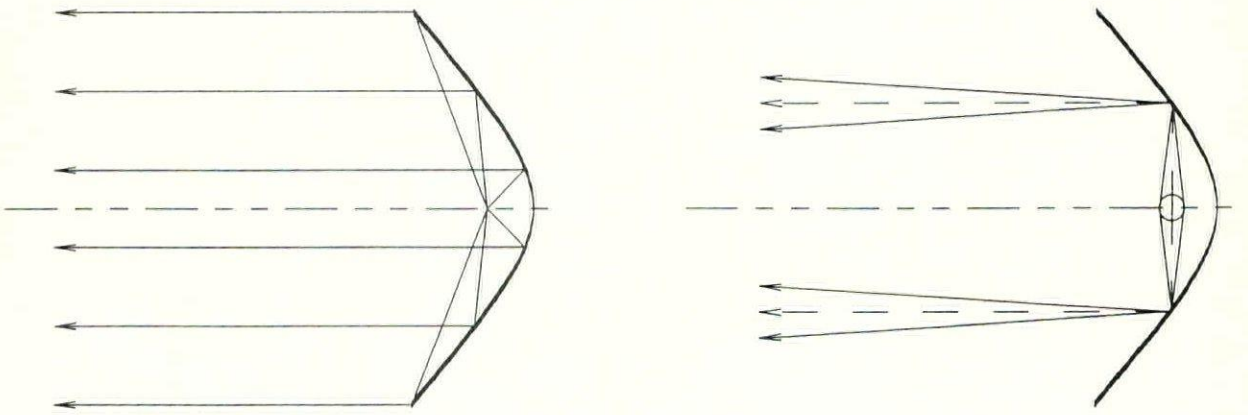
Under the prevailing conditions, the beam is 10 miles long. Observer A, 10 feet from light, sees the top of the beam at 85 degrees to the horizon—at point T_1. He sees a beam about 115 feet long. Observer B, 500 feet from light, still sees the top of the beam at 85 degrees from the horizon. His beam ends at T_2 and is about 5,700 feet long. Observer C, two miles from light, can see the entire length of the beam. Since T_3 is 10 miles above ground, it is seen at an angle of 79 degrees from a distance of two miles.

FIGURE 3—**LONG AND SHORT FOCUS PARABOLOIDAL MIRRORS**



(Left) The long focus (shallow) paraboloidal mirror captures about one third of the light, which is collimated. The remaining two thirds are not captured and lost. (Right) The short focus (deep-dish) paraboloidal mirror captures more than two thirds of the light; less than one third is lost.

FIGURE 4—**BEAM SPREADS FROM A LARGE SOURCE WITH PARABOLOIDAL MIRROR**



(Left) All light rays emanating from the focal point are reflected parallel to each other (collimated beam). (Right) A light ray emitted from any point on the surface of the source is reflected so that the angle of reflection is equal to the angle of incidence. Thus, the subtended angle at which the mirror sees the source is duplicated in the reflected beam, causing beam spread.

Moreover, more than 80 percent of this light comes from a "hot spot" approximately 1 mm (0.04 inch) in diameter.

The combination of a xenon arc lamp and a deep-dish electroformed paraboloidal reflector produces light beams that are collimated to 1-3 degrees. Such degree of collimation is suitable for the creation of a sharply defined, visible beam.

For the purpose of creating a visible light beam, an additional important feature is the beam diameter, determined by the "clear aperture" of the reflector, i.e., the diameter of the reflector opening.

Since what we see when we look at a collimated beam of light "from the side" is actually the light scattered by the tiny particles in the beam, each particle acting as an independent light source, it follows that the larger the cross section of the beam—the higher the number of the particles—the more visible is the beam. In fact, since the cross section, and therefore the number of the independent points of light, increases with the *square* of the radius, a small increment in reflector diameter will have a pronounced effect on beam visibility.

The long, bright columns of light produced by xenon arc searchlights can serve to make a strong visual statement and enhance the appearance of buildings and other outdoor structures. The effect can be best appreciated from distances of half a mile to 10 miles, though under certain conditions it can be achieved well with much shorter distances. Measurements by triangulation of the observable portion of these beams shows them to range from 10 to 15 miles in length when pointed straight up. The most suitable environment for such use of xenon arc searchlights is urban or surburban, under moderate to high temperature and humidity conditions. ■

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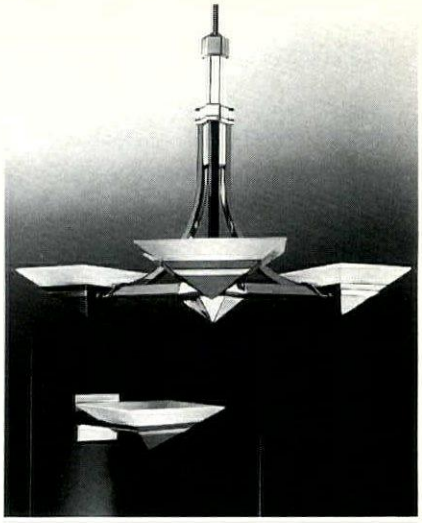

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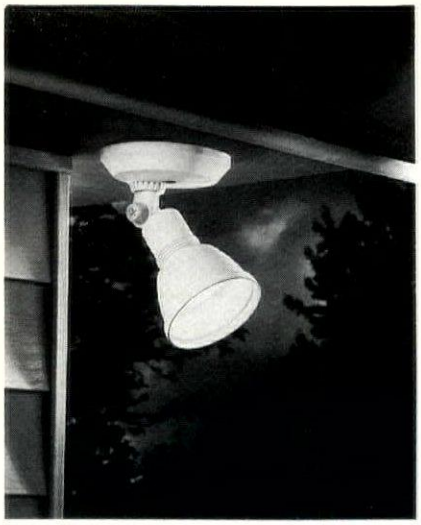
CSL JEWEL LIGHT



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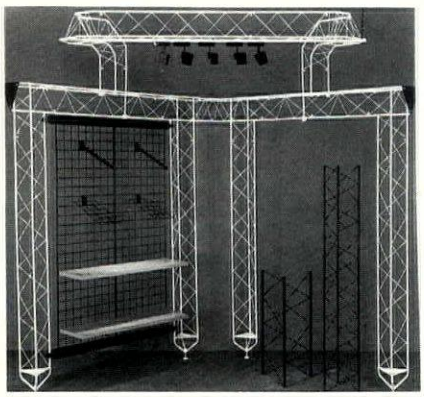

SIMPLEX TRUSS SYSTEM

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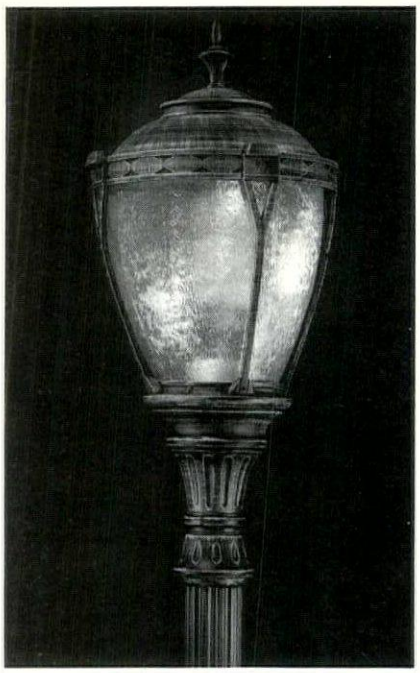

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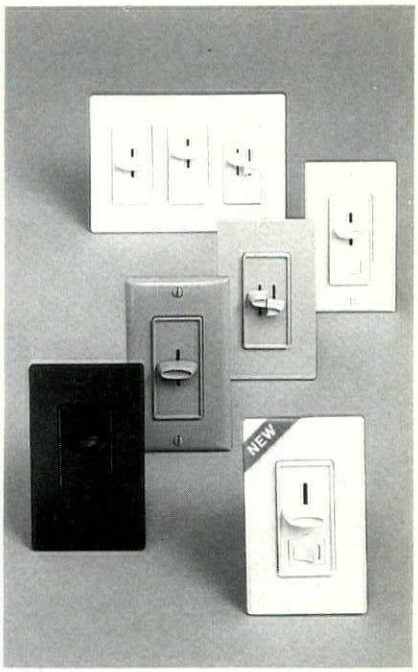

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