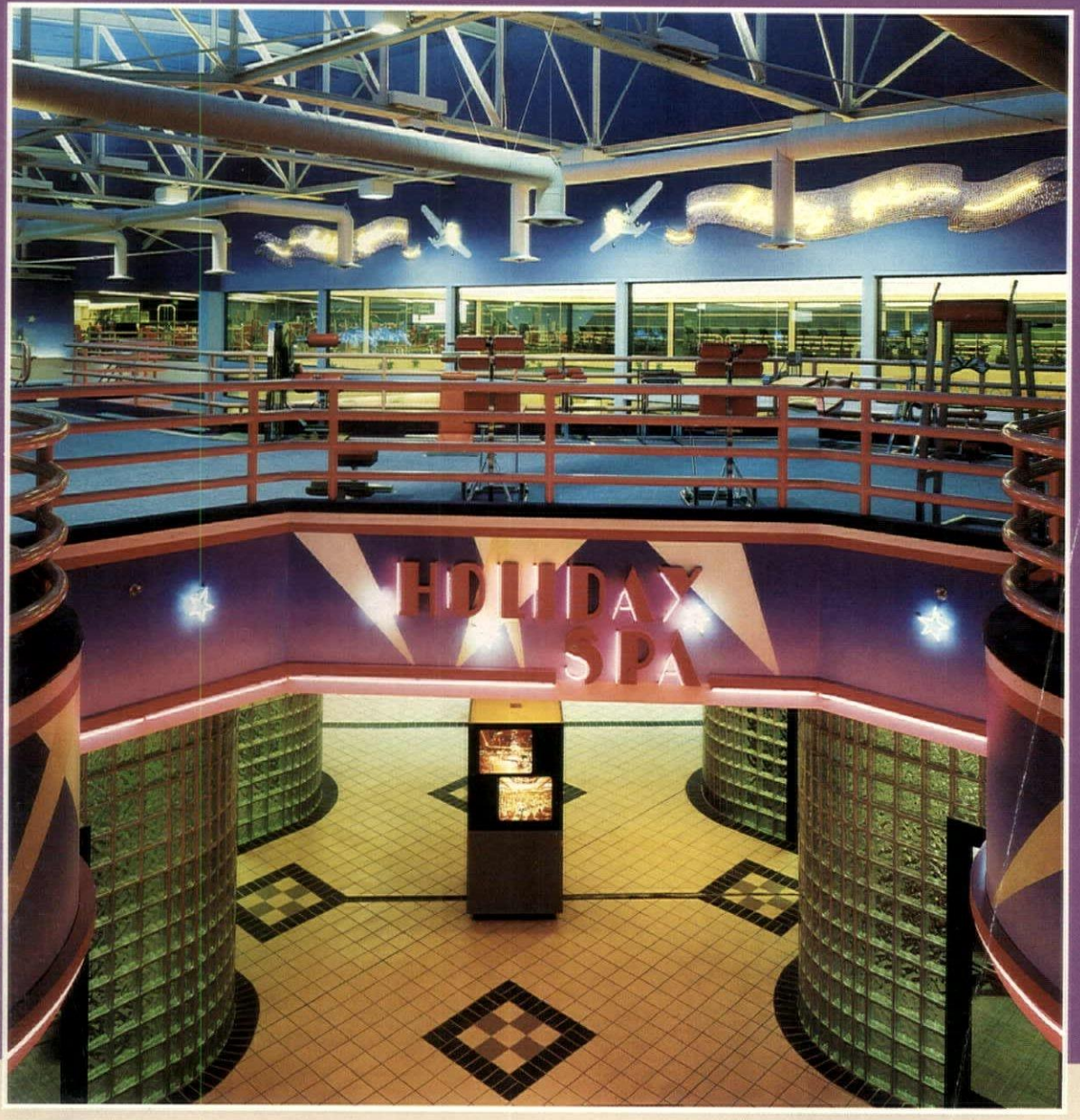
ARCHITECTURAL LIGHTING



June 1988
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Circle 1

ARCHITECTURAL LIGHTING

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Circle 3

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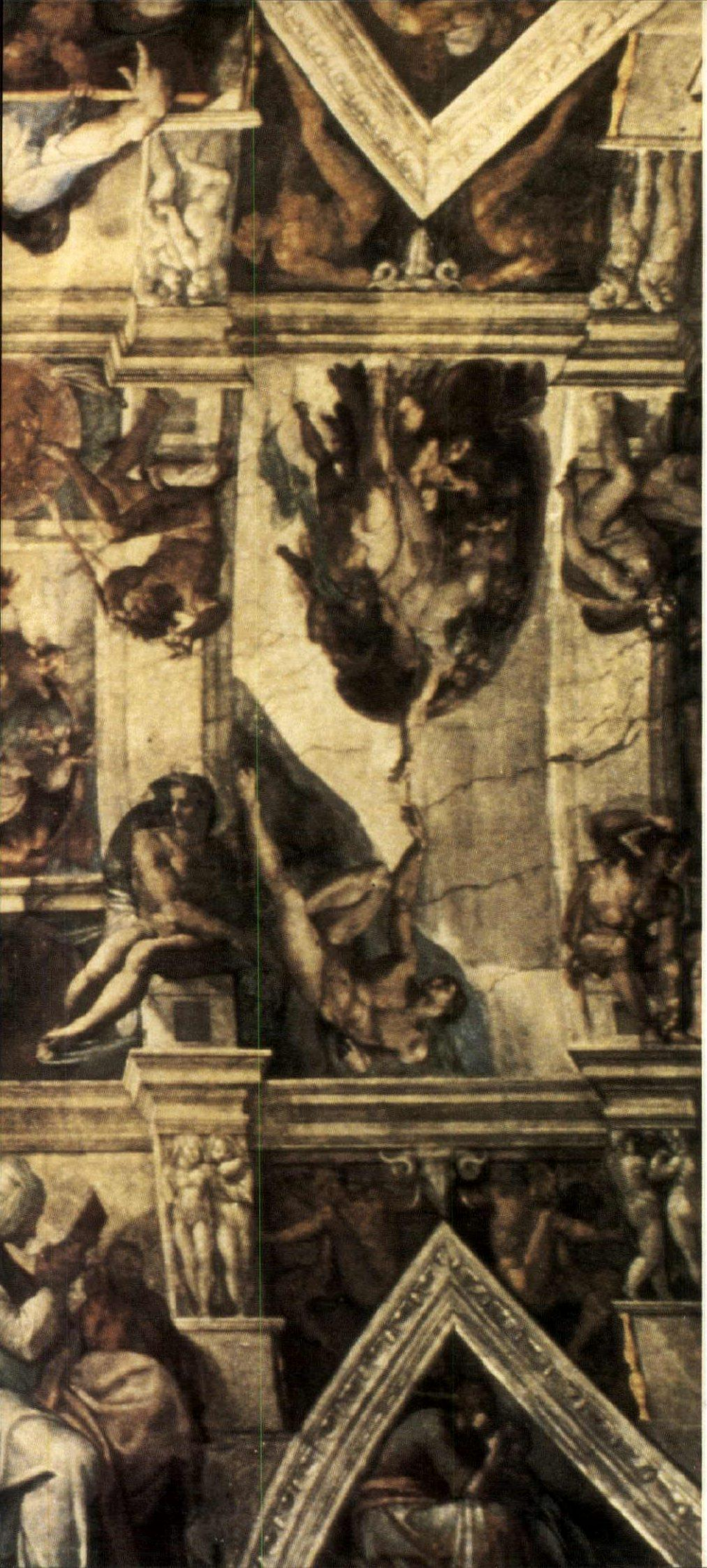

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Circle 9

From the Editor

Next month, *Architectural Lighting* will undergo a *temporary* transformation. In lieu of the regular edition, readers can look forward to *Architectural Lighting Showcase,* our brand new biannual guide to lighting products and accessories. Starting this July, *Showcase* editions will appear every July and December. What's more, we'll be increasing the size of these special editions to 11 by 14 inches, to get more products than ever on every page.

Good design work requires, as much as anything, a good knowledge of what products are available for specification. Designers can do nearly anything they can think of with framing lumber and nails as long as it complies with code and the laws of physics. But luminaires are something different. Ordinarily, most of the readers of this magazine don't build them from components. They specify them. And in order to specify them they need a lot of product information. That's where we come in. We try to provide our readers with the most direct line possible for getting that information from the manufacturers.

Architecture is one of the most product-intensive processes anywhere. Putting up a building requires pulling together thousands of products, most of which can be found in a project specification book. The trick is knowing what — of the hundreds of thousands of products available — to specify.

We understand what you're up against. That's why we provide more lighting product information than any other magazine.

I wouldn't want to take anything away from this issue, of course! But, I hope that everyone will look forward to next month's premiere edition of *Architectural Lighting Showcase.*

Charles Linn, AIA

Project: Headquarters, Real Estate and Construction Division, IBM, Stamford CT
Interior Architect: HOK, Dallas
Lighting Design: Ralph Savarese, IBM, Stamford
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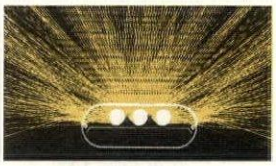

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Circle 11

Letters

Confusing color mixing in Lighting Graphics

I have just read Mr. Sam Mills' column, Lighting Graphics, in the April issue. His approach to "Color Mixing of Light" is confusing, and I feel compelled to comment.

Mr. Mills begins by introducing "two different and separate methods of mixing colors." In the "additive" method, the primary colors of red, blue, and green are mixed in varying proportions to achieve all of the colors in the spectrum. The author includes a color wheel to facilitate our understanding of this process. So far so good. However, he fails to mention that this is color *theory,* not practice. He suggests that we can obtain primary colors from colored incandescents and fluorescent lamps. Oh, if it were only true! Unfortunately, the primary colors of light are not available as catalog items, but rather exist as parts of a theoretical model; useful as a tool to explain relationships in color mixing but *not* available to us in a practical application. It is important to draw a distinction between theory and practice, if we are to understand either.

We can, of course, get some "red" and "blue" colored PAR lamps from the hardware store, point them at a white surface, and get "magenta"-colored light. If we then add a "green" colored PAR and vary the intensity of these three colors by adding or subtracting lamps, we can achieve something like all of the color spectrum. However, "red" and "blue" as used here are generic terms and should *not* be confused with primary colors. Also, the inherent limitation of our "red" or "blue" filters will make some colors impossible to achieve. And, as Mr. Mills suggests, the number of lamps necessary to achieve many colors renders the process impractical.

He next writes of a "subtractive" method, in which we "pass white light through absorption filters to remove different wavelengths or colors" and thereby achieve various colors. If this sounds familiar, it is because we used the same method to obtain the colored light necessary to mix colors in the "additive" method (a "red" PAR lamp is a "white" source with a filter). He suggests that now the light primaries have shifted and can be thought of as the "subtractive primaries." To explain this, he borrows a color wheel from mixing colored pigments and suggests using it as a model for "subtractive" color mixing in light.

I find this approach to be overcomplicated and misleading, useful as an explanation of color filtering perhaps, but not a second method of color mixing. No mixing is taking place, only filtering. Attempts to use his "subtractive primaries" color wheel will only lead to frustration. That is, if we place a blue filter in front of the red shown in this color wheel, the result will be darkness because blue filters, by definition, absorb red light. This color wheel suggests that *violet* light will result! To label this color wheel "subtractive primaries" and then suggest that it be used as a model for understanding colored light is confusing. The subtractive primaries color wheel actually describes the interaction of colored *pigments* and should be labeled as such. It belongs in this article, but it should be properly labeled and accompanied with a discussion of the *interaction* of light and pigment. The greatest failure of this article is the absence of any discussion of this most important subject.

When we see an object, our color perception varies with the color of the light and the color of the object. If the light is red and the object green, we perceive a rather gray color because the green pigment absorbs the red light. An understanding of the interaction of light and pigment is *central* to applying knowledge about the mixing of colored light sources.

An architectural approach to color mixing of light should be an analytical one. We do not as a rule mix colors to produce a dramatic result, as do theatrical designers. Studying color theory provides a structure for understanding general relationships of colors in light. All light is "colored" — natural, artificial, filtered, or unfiltered. Any source can be broken down into component parts. We can then quantify the amount of various colors a source produces. The architects' question is: "What effect will this source have on the finishes in this room?" For example, "Will metal halide lamps reveal the color in my travertine marble floor?" The presentation of color theory should promote our ability to examine these kinds of questions.

Michael D. White, Associate
Horton•Lees Lighting Design Inc.
New York, New York

Misconceptions about primary colors of light

I have followed with interest Mr. Sam Mills' columns on color mixture in the January and April issues. I write to head off certain misconceptions that might arise from a too-strict reading of Mr. Mills' pieces by someone new to the world of additive color mixture.

The overlapping circles and neat, symmetrical diagrams that Mr. Mills presents resemble the color mixture demonstrations that used to be presented for students of stage lighting. They never worked completely because they were based on premises that were, in fact, not entirely true. The commonly misunderstood "facts" were usually stated as follows: "Red, green, and blue are the primary colors of light because they cannot be mixed using other colors, and because they can be combined to mix all other colors." This statement fails on two counts: first, many pure (of one wavelength) spectrum colors cannot be mixed using other colors. Red, green, and blue are not alone in this. Second, any three colors will mix a variety of other colors. The three so-called primary colors just happen to be widely separated from each other, and thus they encompass a large number of other colors. The only "colors" that will mix every visible color in light are the theoretical *tristimulus values,* X, Y, and Z, which are the basis of the science of colorimetry.

I might suggest that someone who is seriously interested in colored light mixture become familiar with colorimetry. Through colorimetry one can become familiar with the asymmetrical nature of color diagrams, which are based upon human color perception. Colorimetry offers accurate predictions of color mixtures through location of the component colors on a "color map" known as a chromaticity plot. It also provides a firm basis for color specification. Colorimetry is discussed in many publications. For a start, one might look at chapter 5 of the *IES Lighting Handbook: 1984 Reference Volume.* A diagram on pages 5–9 gives a good illustration of a chromaticity plot.

William B. Warfel, IALD, President
Systems Design Associates, Inc.
Adjunct Professor of Stage Lighting
Yale School of Drama
New Haven, Connecticut

Lighting Graphics columnist responds

I'm encouraged to see lighting professionals like Michael White and William Warfel taking an active interest in the color of light and taking the time to read my column. Michael White is correct when he says subtractive color mixing primarily involves the filtering of light. Nevertheless, the terms "subtractive mixing" and "subtractive primaries" are used in many reference sources on color and light. It is also correct to compare the mixing of color pigments with subtractive mixing of light — the principle is exactly the same. The more color filters inserted in a beam of white light, the more light is absorbed, making it dimmer — just as more light is absorbed when different colors of paint are mixed, ending up with black.

Placing blue and red filters in a beam of light, as in Mr. White's example, will, of course, produce darkness. This is a case of misleading terminology. The colors in the subtractive primaries diagram referred to are actually magenta and cyan, not red and blue; they are correctly identified in the text and in parentheses on the diagram. The red, green, and blue primary names are an outgrowth of a simplification introduced by the printing industry. Placing magenta and cyan filters in a beam of white light produces blue light (identified as violet in the diagram because blue was used as a simplified name for cyan). The magenta filter removes the green wavelengths and the cyan filter removes the red wavelengths, leaving only blue.

It is impossible to adequately present color theory in a way that promotes readers' ability to examine the effect of light sources on architectural finishes in a one-page column. That is why "The Color of White Light" was presented as a three-part Lighting Graphics column in the October 1987, November 1987, and January 1988 issues.

William Warfel's letter expresses concern about our readers' ability to understand my column on color mixing from a "too-strict reading" of the information, then states some "commonly misunderstood 'facts'" *as usually stated by someone else,* and explains why *that statement* is incorrect. So it is difficult to tell which information concerns him.

Carefully reading both of my recent columns reveals that I said nothing about red, green, and blue being primary colors because they cannot be mixed using other color — Mr. Warfel said it! I agree that any three colors can be mixed to create a variety of other colors. In fact, the first paragraph of the January column states, "These three colors [red, green and blue] are not the only ones that function as primary colors, but they have been found through experience to provide the widest range of colors."

I also agree that seriously interested individuals should become familiar with the science of chromaticity and colorimetry. However, I believe the scientific aspects of lighting are more than adequately covered by the publications of the Illuminating Engineering Society. My goal for the Lighting Graphics column is to present simplified lighting data in a graphic format for easy understanding. Chromaticity and colorimetry are neither simple nor easy to understand and are not a necessary part of the architectural lighting designer's vocabulary.

Sam Mills, AIA, IES

Mixed captions

Thank you very much for the fine review of our products in the March 1988 issue of your magazine. There is, however, one small misprint that deserves clarification. The captions assigned to the output samples from the Point and Isopoint programs are reversed. The gray scale shaded output belongs to the Point program while isofootcandle templates are the exclusive domain of Isopoint.

Please continue the fine standards established with *Architectural Lighting* magazine. Our industry needs and deserves them.

David M. Speer
Vice President, Marketing
Lighting Analysts, Inc.
Littleton, Colorado

Correction

Neon lighting for the Arena Club Lounge in Denver (April 1988, page 28) was fabricated by Absolutely Neon. The April issue incorrectly listed the fabricator's name as Mostly Neon.

Lighting Clinic

Lighting for the visually impaired

Our firm has been commissioned by a visually impaired couple to design a passive solar home. This obviously presents significant lighting problems. Given the amount of research necessary to successfully accomplish this assignment, we are hopeful that the finished product can be utilized by other legally blind people. We are hopeful that you may have information that will assist us in this undertaking.
Susan Brauner Nebergall
C_2G Architects
Knoxville, Tennessee

Visual impairment comes in many forms. So, although the solution you find for your clients *may* work for other people with the same kind of impairment, for the most part, each client's needs will be different.

"Different kinds of impairments create different seeing problems," says Mary Boomer of the Oregon State Commission for the Blind. "For people like me, it's very important where the light is coming from. For example, I go nuts in a place with floor to ceiling windows. For some people dim light is important; for others, contrast can make a big difference."

Dr. Roderic Gillilan, an Oregon optometrist and low vision specialist, describes some characteristics of frequently encountered visual impairments. Glaucoma, for example, causes tunnel vision that worsens over time. People with retinitis pigmentosa also have to deal with tunnel vision. "For those people, it's just like looking down a pipe. For them, and for people who have late stages of glaucoma, you need handrails and must be very very careful about anything they can step on or trip over." So, a lighting issue of particular concern for people with tunnel vision is safety lighting around stairways, doorways, and obstacles.

Macular degeneration has the opposite effect, blocking out central vision and leaving people with only their peripheral vision. "Even people with normal vision have only one or two degrees of fine central vision," Gillilan says, "and peripheral vision is not sharp like central vision. But they can get around. Architecturally, their mobility is no problem. When I walk by this chair here, I don't have to look at that directly to see that it's an armchair; I can see it with my peripheral vision. And people with macular degeneration have normal peripheral vision."

Photophobic people need subdued light. Gillilan recently worked with a woman whose apartment had wall-to-wall glass on one side and all-or-nothing black-out drapes. She told him, "Light is my worst enemy," and he recommended translucent drapes to filter the light.

Cataracts, says Gillilan, "can be compared to the rear window of a convertible. When it's new, it's clear, but as it ages it gets foggy and impairs your view." To describe the lighting needs of people with cataracts, he says, "Driving down the road with a dirty windshield in town where there are a lot of street lights is not so bad. But if you're out on the highway where it's dark, headlights on that same windshield can create blinding glare."

Gillilan and Boomer agree that individual differences are dramatic and that visually impaired people may not have a clear idea of what lighting can do to make the most of their limited vision.

"It's important to interview clients to determine what their special needs are," Boomer says. "Some problems depend on how long the person has been blind." If it comes on very gradually, they may not realize how serious the loss is. Some people may have forgotten what it was like to see well, others may deny that they're losing their vision. "Ask them a lot of questions," she advises. "Do they see better with the light behind them or in front of them? What kind of impairment do they have?"

Gillilan takes that suggestion a step further. "If you ask people what kind of lighting they like, they're going to tell you what they're using." He uses a technique that he also recommends to architects and lighting designers. He gives his patients a visual task — something to read, for example — and seats them near an adjustable arm light. Then, as he moves the light to various positions, he says, "Tell me when you can see it the best." His patients soon recognize the dramatic changes in lighting possible by simply adjusting the distance of the source from the task and quickly respond, "Ah, yes, just right there, that's it."

For specific information on visual impairments related to your project, you might get help through your state's commission for the blind, and you might locate a low vision specialist through the nearest school of optometry. Not every community has a low vision specialist, but most metropolitan areas do, and every state has an optometric association.
Jane Ganter
Associate Editor

Edge lighting: A continuous linear solution

We've been trying for some time to get information on edge lighting of etched glass pieces. Our needs are for small pieces in a stand and in architectural settings. Architectural settings include lighting a piece for a window or between booths in restaurants. Our need is first for smaller stands, which would light a 10-inch by 12-inch sandblasted piece; the problem generally is that we cannot get the lighting to spread throughout the piece.
Susan Bloch
Studio Bloch
Towanda, Pennsylvania

Fluorescent, cold cathode, and neon are all ideal light sources for edge lighting plate glass pieces that have been sandblasted or etched. The edge where light passes through must be polished and clean; this will allow light to pass through the glass more readily. I suggest a high-lumen output source, such as cold cathode, which is available in many color temperatures and color phosphor coatings, thereby giving you a large color selection to choose from. Fluorescents can be used as well, with color gel filters to get a variety of color. Neon, the least lumen output source of all, is also available in many colors. All of these continuous linear light sources should be on dimmers for optimum control of light on the piece being edge lit.

It is also important to consider the dimensions of the transformers for both the cold cathode and neon and the ballast for the fluorescent. Access to the light source and transformers is also quite important; make sure that you can get to those sources readily for replacement or for repair. Transformers can be remote to cut down on the size of the base of the unit.

Large pieces should be lit with high lumen output sources such as cold cathode or fluorescent; smaller pieces can be lit

with neon. The light sources should be as close to the glass edge as possible, if not touching the glass. This will give you an edge lit effect that you'll be proud of.
Robert Singer, Principal
Robert Singer and Associates, Inc.
New York, New York

Reducing noise for low-voltage lighting

Your magazine fulfills a much ignored need in the design world. I would like to see a bit more critical coverage of new products. I have specified a good deal of new, state-of-the-art, major manufacturer, low-voltage lighting. And much of it makes quite a noise. I have very unhappy clients!

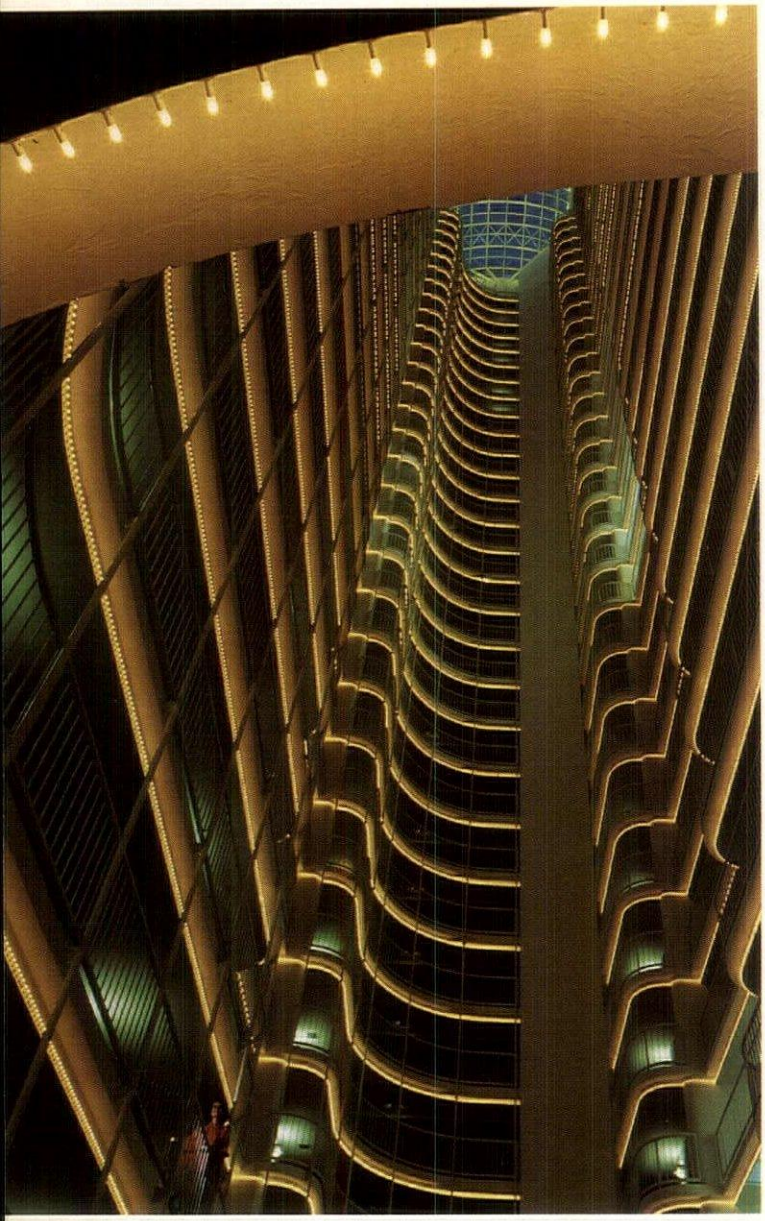
You did refer to the noise problem of solid state transformers and dimmers [March 1988 issue]. While I realize you are not a "consumer report" type of publication and that your advertisers pay for the magazine, in the long run it will help everyone's business if such issues are discussed. Specifically, what types of fixtures cause noise? What types of transformers? What types of dimmers? Also, what combinations of equipment cause problems? And, what, if any, solutions are there? Are there noise suppressors?

A little more hard-core, how-to information is needed for specific types of jobs (noise being more critical in residences). I am quite uneasy about spec'ing any more low-voltage lighting until I get some answers. Hope you can help!
Bruce Davis
Architect
Santa Fe, New Mexico

Noise problems in low-voltage lighting are related to transformers and dimmers, which modify electric power. These components can hum and buzz, just as fluorescent ballasts do. Modern dimming techniques and solid-state equipment can make the noise worse. The technology is relatively new, and most manufacturers are scrambling to correct or improve their products, so expect the situation to get better.

As this issue goes to press, we have just received a Lighting Design Professional column on architectural dimming that explains how to identify and solve noise problems. Jim Benya's "hard-core, how-to" information will be in your hands by August or September. Meanwhile, remember to try out a system before specifying it so you'll have firsthand knowledge of any problems you may encounter.
The editors

Incandescent light strips come out



Project: Venetia Town Residence
Location: Miami, Florida
Architect: Amisano & Wells
Lighting Designer: Abe Feder
Photo: Jay Good

Skylit atria work best in daylight. The inner well of space and light that relieves the density of high rise stacks can turn into a black hole at night, especially as the rise gets higher. This may be no big problem in a work space, but what about an urban residential building that comes alive after sundown?

Miami's 42-story Venetia Town Residence is a "you-never-have-to-leave-home" package. Its two atria above underground parking are surrounded by shops and offices on the 10 lower levels and condominiums on the 32 upper ones. Its builders had to solve a difficult lighting problem 10 stories into construction. They had spaced wall-bracketed lights 20 feet apart to light each floor's terraced walkway. The walkways overlooked the two atria, and the builders saw that the lights weren't enough to fend off the nocturnal bottomless pit yawning at every front door. That's when they called in New York lighting designer Abe Feder.

Because the electrical service had already been sized for the building and could not be increased, the solution had to milk the existing power budget for maximum visual impact. Feder conceived a new and grander use of a familiar product. He used 24-volt light strips — rows of tiny incandescent lamps of the kind usually installed behind shields to delineate steps, handrails, and similar architectural details. He placed them along the outer reveal of each walkway's ceiling. Feder favored this approach for its functional and aesthetic advantages.

The primary practical advantage is low maintenance. Because the lamps are rated for a design voltage of 28 volts, operating them at 24 volts can increase their life up to 43,000 hours. Replacement then need take place only about every 10 years. Relamping is a matter of clipping each lamp in and out from a stepladder.

The nearly 80,000 0.88-watt lamps not only "glow the walls," says Feder, making the walls and atria look wider, but also supplement the walkway lighting by defining edges and larger surrounding space. Neon, for example, Feder says, would use more power, would not be continuous, and would clash with the color temperature of the incandescent lighting coming from each apartment.

The strip's gentle sparkle is an effect Feder thinks will catch on. For him, it's a pleasantly surprising turn back to lighting design's beginnings — when lamps were few and relatively short-lived, and designers could choose only how many lamps to use, not what kind. "Looking at what the rows of thousands of incandescents did for these catacombs," Feder says, "reminds me of the way Mr. Edison had all the theater people going nuts over the same basic thing in signs on Broadway back in the thirties."

—Mike Heffley

For product information, turn to page 70 and see Manufacturers.

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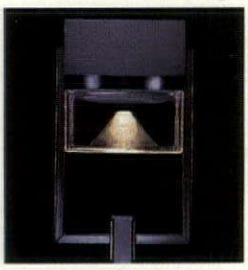

The seamless acrylic prismatic cone/cube helps reduce "puddles" of light at the pole base while projecting light in a wide overall pattern; one wide enough to reduce the number of fixtures and still provide up to a 6:1 spacing-to-height ratio.

The ParkLane luminaire integrates with practically any contemporary architectural theme.

ParkLane uses either metal halide or HPS lamps and is available in 4 mounting configurations: C-bracket, tuning fork, straight arm, and flush mount. Plus, the cube can be replaced with a flat door assembly. In addition, ParkLane is backed by an exceptional 5-year warranty.

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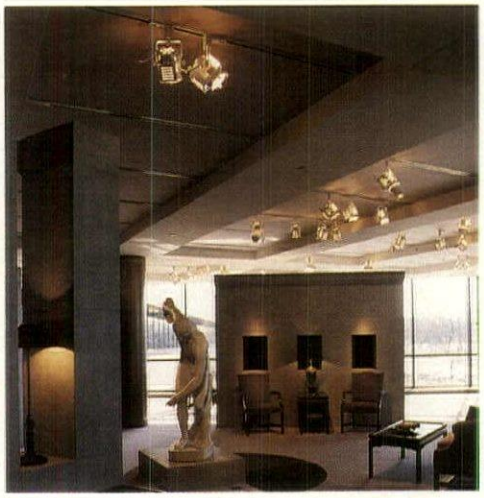
Circle 14

Curtain up! Theater lighting for showroom



Project: Steelcase corporate headquarters showroom
Location: Grand Rapids, Michigan
Lighting Designer: Brian Hire
Electrical Engineer: WBDC
Steelcase Interior Design Team: Mary-Margaret Munski, Rob Young, Christine Lefley, Cindy Specht
Photos: Mike Monahan, Steelcase

A lighting designer's theater background inspired a dramatic solution to the lighting problem in his company's version of the stage: its product showroom. Brian Hire is theater coordinator for Steelcase, a manufacturer of office equipment. He thought it was time to update the old showroom lighting system, which used adjustable eyeball-type downlights fixed on ceiling tiles. Hire wanted to bring in a Fresnel-lensed fixture used in the theater because of its optical capability for gathering and focusing incandescent light.

"A lot of our products have a wood veneer, which this warm light really enhances," Hire says. "The focusing is especially important when we have to dim the light to keep from making the wood look gray."

The problem was that most Fresnel-lensed units were too hot, too big, and too ugly, Hire believes, to use in the showroom. The first ones Hire found that were small, cool, and attractive enough came with a focus too uneven for his needs. "The light tended to have bright spots in its beam."

He eventually found a small Fresnel-lensed unit that filled his needs. It's fist-sized and features a movable carriage for its lamp and hemispherical reflector, providing a controllable spot-to-flood focusing range. Hire asked the manufacturer to make the custom track-mounted unit. He says the care taken in designing the relationship of light source, reflector, and lens eliminated the focusing problems he saw with other track Fresnels.

UL approval of the unit is for only 150 watts; fortunately, that suits Hire's needs perfectly. "Our building is entirely heated and air-conditioned from within," he says, "so I had to work around strict HVAC capacity restrictions. The lamp life at that wattage is over 2000 hours, which was enough to make maintenance happy, too."

These advantages and the computer-driven dimming system overcame management's understandable caution about investing in an unorthodox new system. Hire persuaded them that the combination of dimmers and track mounting is an easy, cost-efficient response to the need for lighting changes presented by changing product displays.

"The computer is quite cost-effective," he says, "and can control hundreds of dimmers. I'm controlling about 500 now, on a regular lighting board such as I used in the theater."

All that, and better lighting too, was a long-term benefit the company couldn't refuse.

—M.H.

For product information, turn to page 70 and see Manufacturers.

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Bold iguana chandelier prowls Manhattan bar

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or Designer: Nick y
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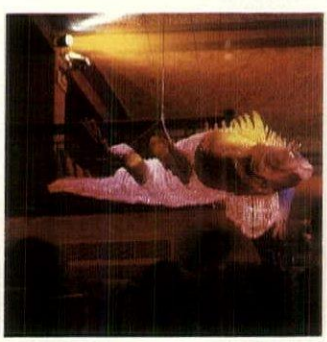

At Cafe Iguana, the lighting solution for the bar is a signature piece for the entire establishment. Lighting designer Robert Singer wanted to create a visually stimulating design that would make the high-ceilinged bar area seem intimate, unusual, and fun.

Singer reasoned that a restaurant named Cafe Iguana should have an iguana. He dreamed up a fantasy lizard: a sculptured crystal chandelier that hangs diagonally over the bar, attracting stares through streetfront windows. The giant lizard — it's 14 feet long — is suspended just out of reach of customers, and thanks to lighting aimed at the top and sides, it changes colors as the evening progresses.

Singer imagined the iguana enjoying a desert sunset. "The lighting design evolved around a central image of a Mexican courtyard with the sun's last amber rays casting shadows and color throughout the space," he says. He designed the restaurant's lighting and control system and built the iguana of strong, lightweight materials.

The frame — from neck to tail tip — was manufactured of aircraft aluminum. Head and legs were sculpted from an aluminum screen, fiber glass, and an acrylic polymer emulsion mixed with cement and reinforced with glass fibers. The completed parts were bolted together, then painted iridescent bronze and copper.

Steel wire is strung through the frame to support strings of Italian crystal draped around the body and inside the cavity. When the nearby HVAC fans come on, the crystals waver and sparkle, although the frame of the 350-pound unit barely sti

The only light source in the iguana is a 200-watt PAR 46 medium flood lamp inside the head. This lamp is aimed through the crystals in the eye and gives an aurora borealis effect to crystal pendants on the edge-lit crown.

Eight PAR 56 cans splash light through the crystal lizard onto the bar and surrounding area: four 300-watt medium flood lamps beam straight across to wash the iguana and the wall behind it, creating shadows and a backdrop for color changes, and four canopy mounted 500-watt quartz narrow spot lamps beam down at a 30-degree angle. Above the vestibule, four 6-volt fixtures highlight the crystal headpiece.

The Mexican sunset theme continues in the dining area of the 8000-square-foot cafe. To simulate the sun's rays passing through shuttered windows, Singer placed grid templates and pale amber gold filters on 4½-inch zoom ellipsoidals behind the perimeter of wood slatting in both the bar and dining areas. He customized column-mounted fixtures to hold glass filters for a vivid color effect on the ceiling: a golden amber wash streaked with flame and sky blue. Such a sunset would make any iguana wish its night would never come.

—Gareth Fenle

For product information, turn to page 70 and see Manufacturers.

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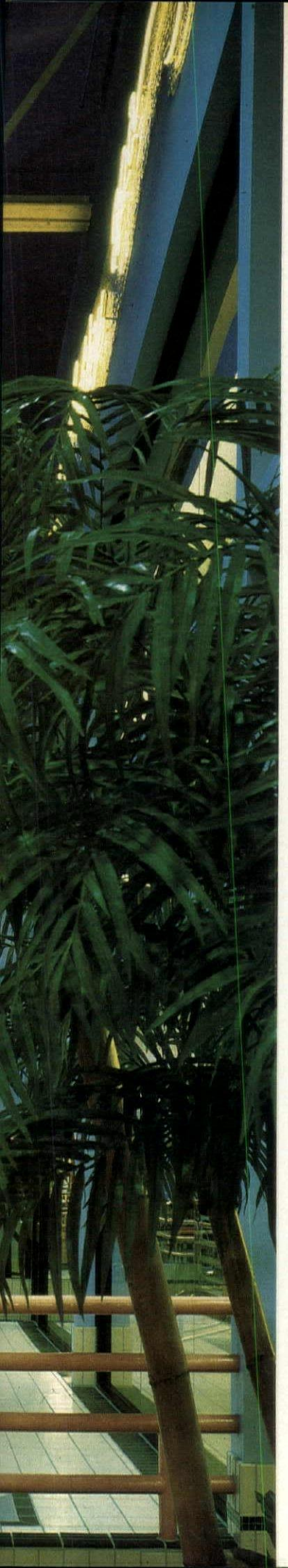


'80s health spa captures glamour of '30s Hollywood

ARTICLE BY
JANE GANTER

PHOTOGRAPHS BY
SHELDON LISS

"Health clubs are a hot, new, highly competitive consumer service," says lighting designer Sheldon Liss. "The owners know that an attractive and well-illuminated interior helps motivate prospective patrons to become members. They know that a well-designed floor plan keeps members satisfied and that satisfied members refer their friends."

Mike Minna, director of construction for the Holiday Spa Health Club in Huntington Beach, California, says that the owner's only design directive was this: "Make it better than the last one." Under most circumstances, those instructions would barely open a conversation. But Holiday Spa had worked with the same architect for several years. "This particular architect has worked on, probably, six of these clubs," Minna says.

Because of that long-standing relationship, the designers knew that Holiday Spa likes to have a high level of light in its clubs. "One, it's safe," says Minna. Outside, people need to feel secure walking to their cars at night. Inside, members need to be able to see to work the machines, and employees need to be able to monitor the activity.

"And, two, it tends to show off all the colors we put in finishes. We have a lot of painted graphics on the walls, we have a lot of different colors in our carpets and in our tiles. We use so many different colors, it makes no sense to put all the money in all those colors and then not light it well enough to see it."

"We try to encourage activity," says project manager Dan Clark of the Danielson Design Group. "All of the colors we select and the way we arrange spaces are designed to give you a feeling of excitement and

RICHARD LOVELESS

Exterior lighting is designed so people can feel secure walking to their cars at night.

Project: Holiday Spa Health Club, Inc.
Location: Hollywood, California
Owner: American Legion, Hollywood Post No. 43
Architect: Danielson Design Group; designer, Donald C. Iler, AIA; project manager, Daniel E. Clark, AIA
Lighting Design and Electrical Engineering: Liss Engineering, Inc.
Interior Designer: Brent D. Cornwell, Inc.

energy when you go into the facility. You want to be motivated to do something. Motivated to work out. The facilities have quite elaborate interior finish materials and colors. There are carpets and tiles and stripes everywhere — and neon."

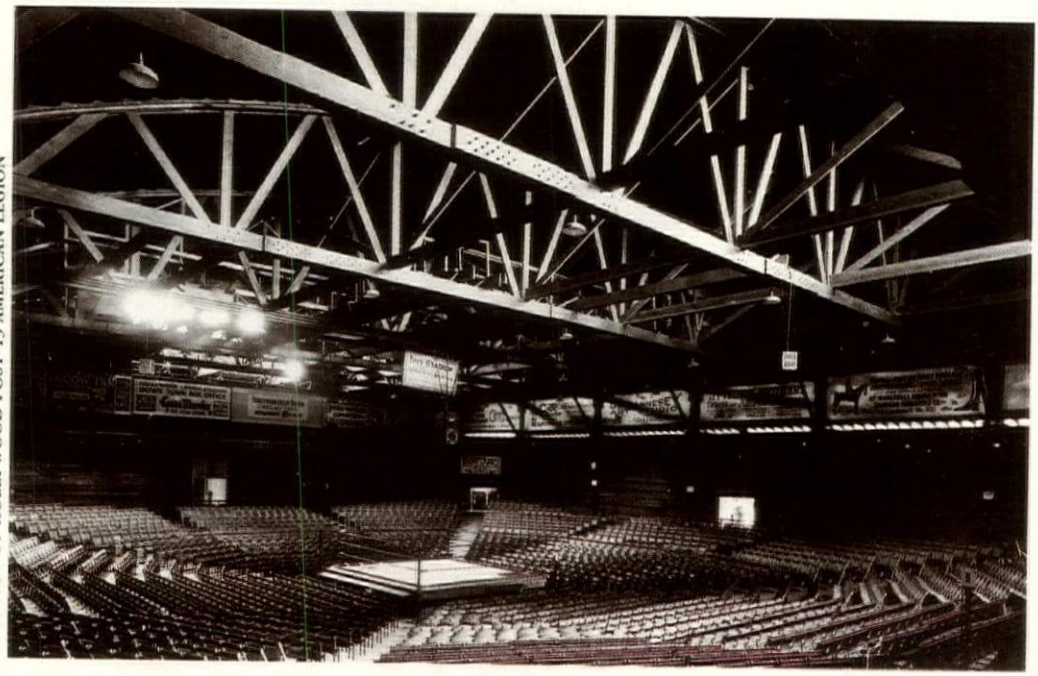
The architect considers club members part of the design, too. "The people using the facility are a big element in the design," he says. "A high level of activity is born by the fact that a lot of people are there working out."

Boxing Arena to Bowling Alley

Early in the 1930s, an American Legion Post had an outdoor boxing arena on this site. Later they remodeled it into an indoor boxing arena, built of structural concrete. In Hollywood during the 1930s and 1940s, Friday night was fight night. Some of the biggest Hollywood stars had their own chairs at the Hollywood Legion Stadium, where spectators might ogle the likes of Jose Ferrer, Rosemary Clooney, Bob Hope, Tony Curtis, Dean Martin, George Raft, and Lou Costello at ringside.

After hosting two decades of boxing, the building was remodeled and, in 1959, became a bowling alley. When charged to give the building its third life, as a health club, Dan Clark says,

Holiday Spa owners like a high level of light — partly for safety, partly to show off the bright colors used in the facility.



COURTESY OF HOLLYWOOD POST 43 AMERICAN LEGION

Fifty years ago, the Holiday Spa building was the site of Friday night boxing matches. The architects saved the bowstring trusses and used them as part of the design over the main workout area because they "have a lot of character."

"One thing we did was try to preserve some of the original character of the arena. That character was lost during the sixties and seventies, when the building was used for bowling."

"We saved the concrete shell and we saved the roof structure," Minna says. There was good reason to preserve them, according to the architect.

"The beautiful steel bowstring trusses up in the roof have a lot of character and we wanted to try to expose them as part of the design over the main workout areas," Clark says. That proved to be a challenge because most fireproofing materials ruined their look. So the architects researched many different products and found one that let them keep the original flavor of the trusses. "In fact," says Clark, "you can compare an old photograph with a new one and still see some of the rivet heads."

Indirect fluorescent lighting prevents glare from distracting runners on the one-eighth-mile track.

Capturing the Glamour

The architects set out to create a 1980s physical training facility that captures some of the glamour of Hollywood's heyday. "The boxing arena itself relates to the health club," Clark says. "It's a modern version of that, but, of course, it's not used to train boxers."

If visitors sometimes get the feeling they've entered the Hollywood of the 1930s and 1940s, it's no accident. "What we tried to do is take little pieces of the early Hollywood era and use them as a theme for the graphics. The Jazznastics room has a small chorus line with rolls of film that twist around the room. Stars are painted in various places. The neon airplanes towing banners are a throwback to that era." In some places there are search lights for graphics, harking back to the days of spectacular Hollywood premieres and trompe l'oeil theater marquees.

Lighting the Holiday Spa

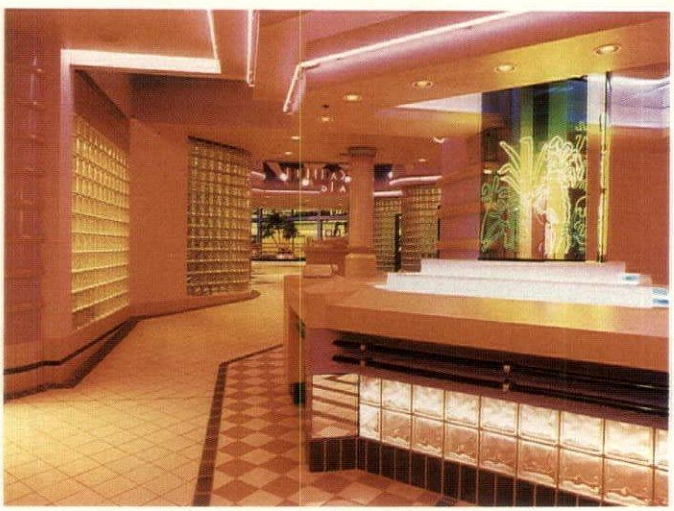
The exterior entry stairs and the forward lobby are lit by recessed metal halide downlights. People entering the spa see yellow, rose, and green neon art attached to clear sheets of acrylic. Adjacent offices with glass block walls also contribute light to the lobby, where wall-mounted neon outline lighting adds a welcome red component.

A one-eighth-mile carpeted

RICHARD LOVELESS

The Jazznastics room, which harks back to the days of glamorous Hollywood premieres, has a four-circuit light track and a theatrical dimmer rack.

Detail of neon art in the entryway.



RICHARD LOVELESS

Recessed metal halide downlights light the entry stairs and forward lobby. Glass block walls of nearby offices also contribute light to the lobby.

running track circumscribes the upper level. The design team chose indirect fluorescent lighting for that area to prevent the lighting from distracting the runners. An 8-foot-high soffit with a vaulted center holds continuous row, pendant-hung, twin-tube uplight fixtures.

The Jazznastics area — where an instructor leads members in exercises to music and flashing lights — has a four-circuit light track on 4-foot centers. A theatrical dimmer rack contains eight incandescent dimmer modules that control the track lights. Light heads at 6-foot intervals provide the lighting effect.

The advanced training room for men and the private exercise rooms for women are illuminated by 175-watt metal halide lamps in 2-foot by 2-foot recessed fixtures. Very narrow 12-volt MR16 spotlights create sparkle on the shiny chrome-plated exercise machines. Metal halide was chosen for its excellent color rendition.

Indirect Lighting

While the club's owners want maximum light values, they also are concerned about glare. In a facility such as this, people are often lying on their backs looking up. "We did everything we could to get an indirect solution," Clark says, "but the entire ceiling was

painted a dark color to simulate nightfall. That ate up a lot of the indirect lighting; the dark color was like a sponge."

"The configuration of the structural members and roof sheathing made indirect lighting a natural application," says lighting designer Sheldon Liss. "Unfortunately, there was some miscommunication," Minna says. "That meant adding downlights because Liss was not informed that the ceiling was going to be painted a dark midnight blue."

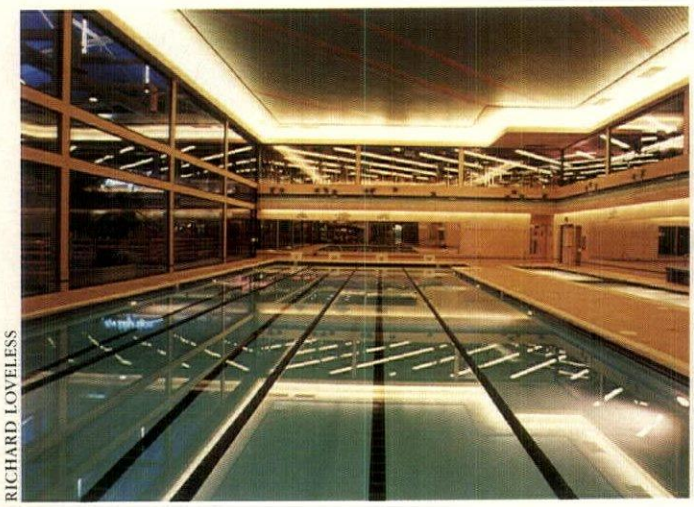
Even with the change of plans, the designers and owner are pleased with the outcome. "We have a transition of color," says architect Clark. "The graphics theme goes from twilight to nightfall with stars. A light trough provides a lot of the indirect lighting. So the uplighting and trough work in perfectly with the glow on the 'horizon,' and it just blends right into the graphics."

The owners wanted lighting in the pool room to be somewhat more subtle than that in other parts of the facility. Liss's lighting design provided for both the subtlety of indirect lighting and ease of maintenance. "We used plain, open strip, bare lamp fluorescents set in ceiling coves," Liss says. "An anodized aluminum system ceiling provided a highly reflective low-maintenance medium for light distribution." Triphosphor lamps were selected for their long wavelength output and high efficiency.

Overall, the two primary lighting goals were to design for minimum glare and to plan for economical operation. Louvered fixture lenses, narrow beam downlights, and indirect lighting helped to achieve a relatively glare-free environment at normal viewing angles. The designers used metal halide and fluorescent light sources wherever possible because of their lower life-cycle costs compared to incandescent. Incandescent sources played a minor role — for example, as accent sparkle and for flashing in the Jazznastics room.

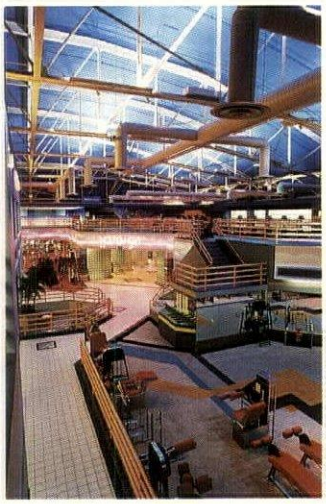
"Holiday Spa wants the best health clubs in Southern California," says Clark. "It's that simple. They pretty much turn us loose to come up with some exciting schemes. Here we really pulled out all the stops to take advantage of a historic building while designing a vibrant health spa that exudes the excitement and glamour that Hollywood evokes." ■

For product information, turn to page 70 and see Manufacturers.



RICHARD LOVELESS

The owners wanted the pool lighting to be subtle and easy to maintain, so the lighting design used indirect fluorescent cove lights and an anodized aluminum ceiling system.



RICHARD LOVELESS

Very narrow MR16 spots sparkle on chrome-plated exercise machines.

Theatrical approach brings drama to lighted murals

Gareth Fenley

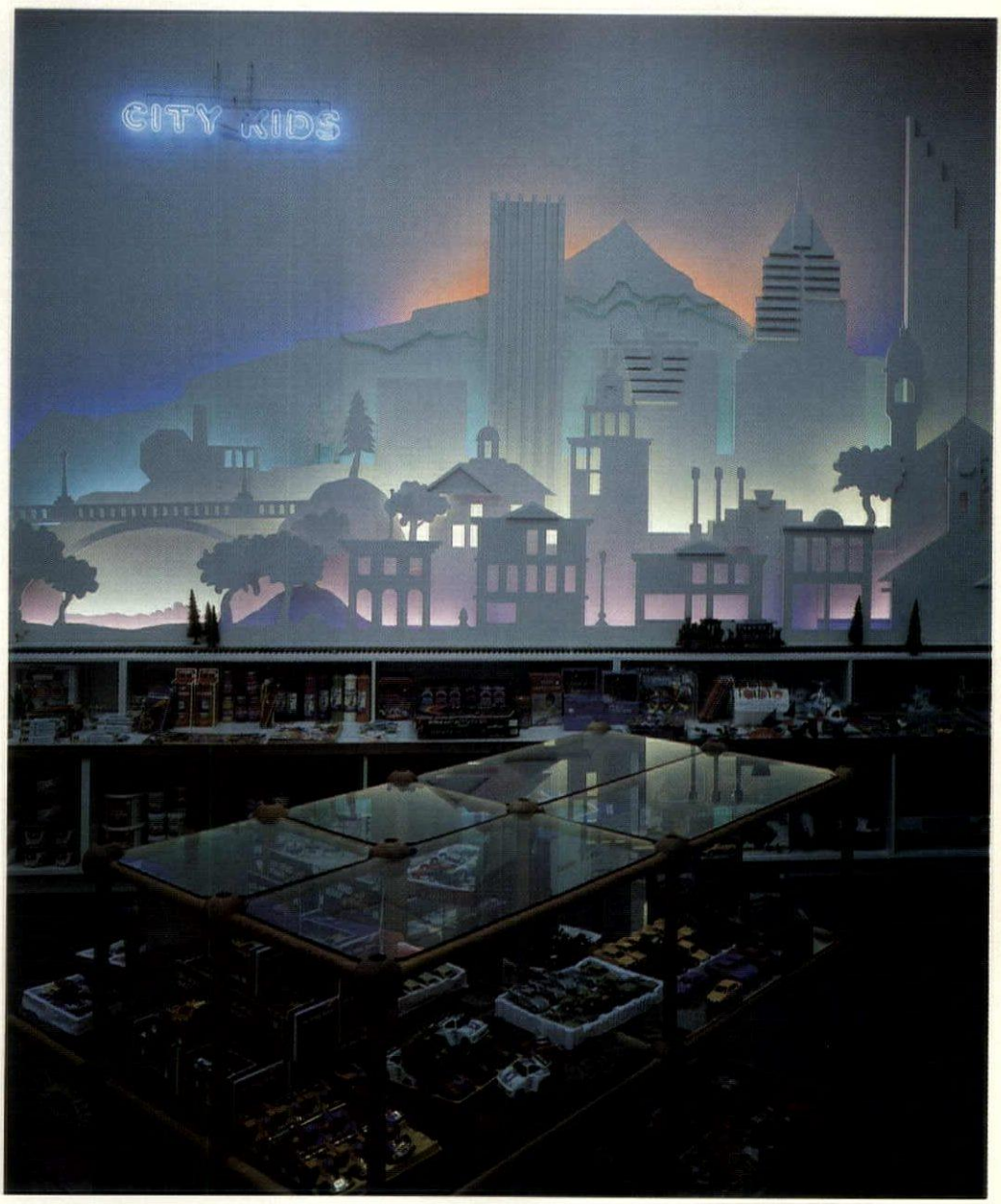
Gareth Fenley is senior assistant editor of Architectural Lighting.

Robert Dupuy learned lighting design while working in theater, where light creates color, mood, and contrast. Now he spends most of his time doing straightforward technical applications like calculating fixture layouts for office lighting. So he's refreshed by projects that call on his theatrical skills — such as lighted murals, which he calls "pure theater."

Dupuy's first mural was commissioned for a toy store. The owner wanted to move customers along the aisles of merchandise toward the back of his store. For a striking wall treatment that would appeal to children and adults alike, he approached Interlight, a company that specializes in architectural lighting, commercial displays, and theatrical consulting and scenic design. Lighting designer Dupuy and his partner Jeff Seats agreed to create a graphic image of a skyline that would visually relate to the store's name. Together, they freely interpreted the concept and created a three-dimensional mural.

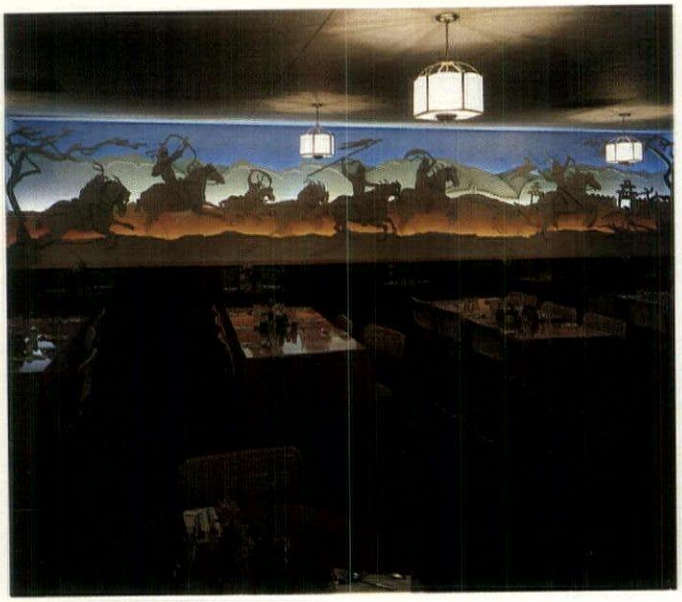
The owner expected to light the mural and actually installed a strip of track on the ceiling. But he never used the track because this mural lights itself. Fluorescent lamps colored with theatrical gels are mounted on the back surface of the particle board layers, close to the upper edge. The reflected light brings color to the mural's white surface. Dupuy selected the color media, including orange and blue diffusion media to diminish lamp image. Because diffusion media come in a limited range of colors, the remaining colors are regular gels.

Dupuy and Seats liked the results so much that they put a photo of the City Kids mural

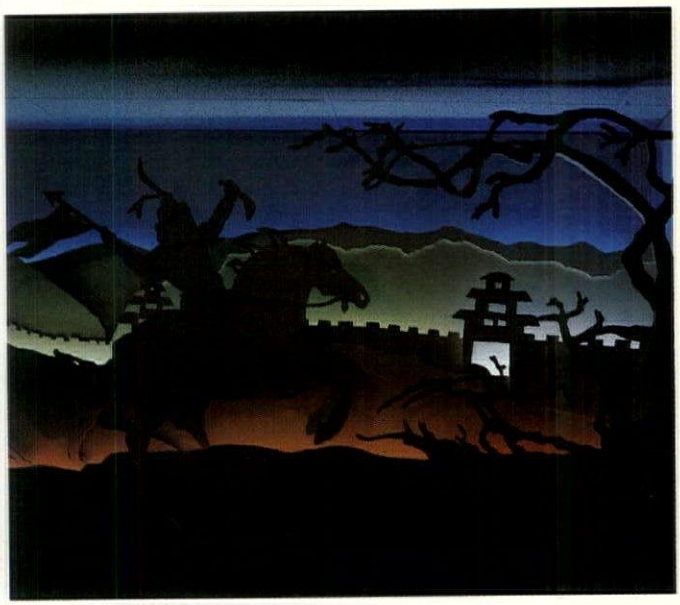


Interlight designed a lighted mural to attract customers toward back of toy store. Owner added neon sign.

Project: City Kids
Location: Portland, Oregon
Architects: Grisby Christopher, Brun/Moreland/Christopher
Project: Chang's Mongolian Grill
Location: Portland, Oregon
Interior Designer: Edelman, Naiman and Bisset
Lighted Mural Designer: Interlight
Photos: David McShane



Chang's Mongolian Grill asked Interlight to make the attack of Genghis Khan look pleasant.



Fluorescent lamps with theatrical color media backlight the murals' particle board cutouts.

in their portfolio. "It was a fun project, but not one we expected to do again," Dupuy admits. Later, though, an interior designer reviewing the portfolio pointed to the picture and asked if Interlight could do a mural of Genghis Khan.

Attacking warriors make a strange motif for a restaurant. But that's what the client wanted for Chang's Mongolian Grill: an illustration of Genghis Khan storming the Great Wall of China. Chang's was the latest in a series of Chinese restaurants to open in the same location. "No one knew if it would fly; they were taking a gamble," says Dupuy. The renovation budget was limited.

By commissioning the mural, the owner got a visual focal point that holds the interest of new and repeat customers. The Interlight partners again created the graphic design, working from various research materials suggested by the interior designer. They used the techniques developed for City Kids to create the mural.

"It's very complicated and labor intensive," Seats says. "Originally, we used a real trial and error method with glue, screws, and staples." The first step is a scale model, which helps clients to visualize the finished project. "When they see it, they know exactly what we're talking about," says Seats. "We also use the model to perform color tests."

Although a carpenter built the full-scale mural for City Kids, Interlight decided to construct and install its own design at Chang's. Transparencies made from the model were enlarged and the outlines traced on particle board. The relatively fragile ½-inch-thick cutouts were made with a saber saw and band saw, then assembled and painted with satin white latex paint. For economy, Dupuy specified the least expensive lighting equipment available: bare strip lamp holders and cool white lamps.

Three years later, both murals — and the small businesses that commissioned them — are intact, as shown in the accompanying photos, and all the original lamps still operate. Dupuy recently had to replace some faded color media. Orange and yellow faded the most, but purple and turquoise also lost some color. At Chang's, two 4-foot orange sections faded, but not the rest, perhaps because the sections came from different manufacturing lots. To reduce fading, Dupuy now places UV filter material between the lamps and the color media.

Interlight's murals have generated several additional proposals and projects. Chang's Mongolian Grill has opened two more restaurants and is considering other locations — each to have the Genghis Khan mural. In the future, Dupuy would like to design more murals, perhaps using moving light.

"My partner designs things with light in mind, so when it gets to my desk it's easy to work with," says Dupuy. "Lighting is the most important aspect of our murals. The graphic portion is designed to take the effects of light into account, but without the light the mural would appear lifeless. By combining light with a strong graphic image, we were able to achieve color, depth, and excitement."

"The murals represent a true combining of our skills as lighting and scenic designers," says partner Seats. "We intend to give clients a product that is organic to their environment, while adding Interlight's trademark, a flair for the dramatic."■

For product information, turn to page 70 and see Manufacturers.

Storefront sources of cold cathode, neon help transform concourse

Gareth Fenley

Gareth Fenley is senior assistant editor of Architectural Lighting.

Some of the most unpleasant passages in air travel take place on the ground, dragging luggage through dingy concourses lit with a random assortment of warm, cool, and burned-out fluorescent lamps. Redesigned storefronts along a renovated concourse may not lighten the load, but their architecturally integrated neon and cold cathode lighting brightens the passage along the curving South Concourse at Washington National Airport.

"The shops had been in place since 1940, when the airport was new," says project architect Daniel Ashtary of Kerns Group Architects. Before renovation, a line of columns barricaded glass storefronts along one side of the concourse. Light from poorly maintained fluorescent fixtures streaked across the ceiling and reflected off the glass. "It was difficult to see into the shops because light levels were higher on the concourse side of the glass than on the interior side," says Ashtary.

Because every column has a slightly different diameter and every wall segment is a different length, the renovation required exceptional custom detailing. For technical assistance with the lighting, including full-scale modeling on site, the Kerns Group collaborated with Larry Kanter of Neon Projects during the design phase.

To give the concourse a new look, the designers first removed a double row of recessed fluorescent fixtures that reflected off the storefront glass. Next, they improved the lighting mounted in a built-in cove across the corridor from the shops. "It was inconceivable to us that the cove lighting had originally been designed and installed the way we found it," says Kanter. Dark spots occurred at lamp holders and near the ends of the cove, where the

Before renovation, a line of columns barricaded concourse storefronts.

New glass block walls and cove are lit with concealed cold cathode.

Project: South Concourse renovation
Location: Washington National Airport, Washington, D.C.
Architect: Kerns Group Architects
Lighting Designer: Neon Projects and Kerns Group Architects
Postrenovation Photos: John Troha

lamps simply stopped short, but the main problem was the height of the fluorescent tubes. "They didn't fit down into the cove, so they were actually visible to people walking in the concourse."

While Neon Projects was installing the new cove lighting — which uses warm white, 25-millimeter cold cathode tubing — Kanter found some old circuitry that suggested cold cathode had been the original source. Custom-fabricated supports keep these new tubes low and hidden, minimizing annoying reflections on the new storefront glass.

To increase light levels for a busy pedestrian walkway while making the retail storefronts the brightest visual element, Ashtary turned the bottom 2½ feet of the storefronts into a light source: a backlit glass block wall. The serpentine wall reclaims wasted space by weaving its way among five of the nine columns; curved, laminated glass creates generous bay windows for dramatic merchandise displays.

Two strokes of warm white, 20-millimeter cold cathode tubing backlight the glass block walls. "It's quite popular to put neon behind glass block, but in a slightly different way," says Kanter. "It's often put behind glass block with the intention that the neon tube itself show through for decorative purposes. Textured glass block gives the tube a wiggly form. In this case, though, we were simply interested in illuminating the walkway and brightening up the storefronts in general."

Cold cathode suits this application perfectly because its wide-diameter lamps, although bulkier and harder to shape than neon lamps, produce more lumens per foot. White acrylic panels back the glass block wall to diffuse the light. The panels are attached to the wall with steel studs set in the mortar joints.

Neon signage accents aluminum-clad column, now part of bay window.

To insert the lamps and their sockets in the narrow slot behind the acrylic, Neon Projects assembled them on plywood panels and lowered the plywood into the wall. Removable interior sills in the tenant spaces provide access for installation and service.

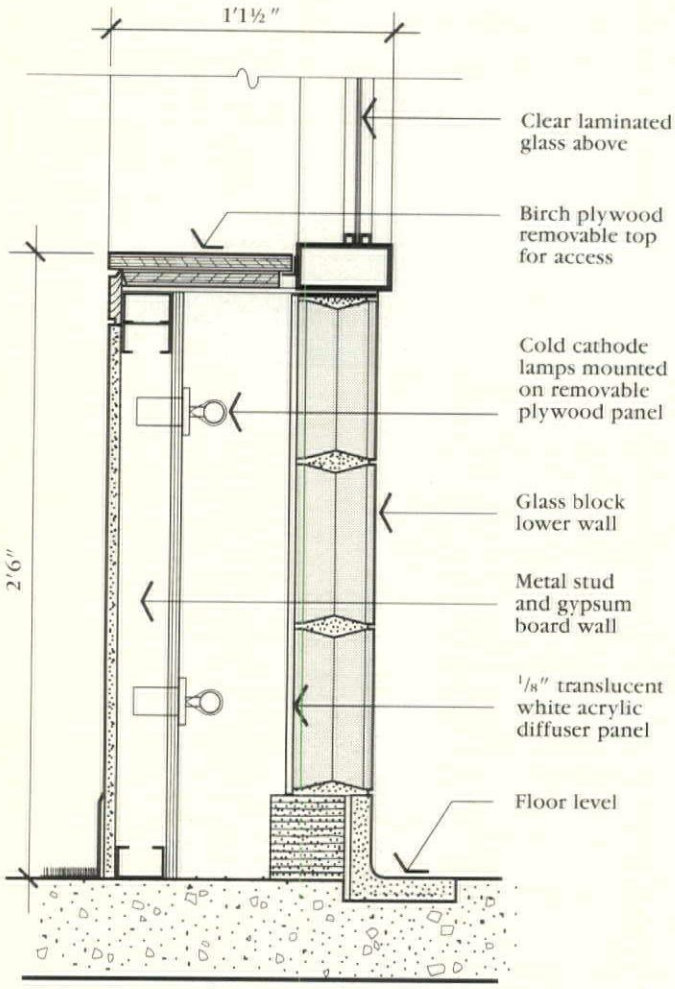
The designers chose neon for color accent and signage on the columns. The circles of slim 12-millimeter neon tubing offer a visually striking color effect without glare. Ashtary chose cool white and cobalt blue to accent the new anodized aluminum cladding and polished aluminum signage collars.

Cobalt blue, the color of the lights that line airport taxiways, is not available in cold cathode diameters. "So, on all accounts, the columns called for a neon solution," says Kanter. The signage typeface and backlighting techniques, like many of the project details, recall the Federal Art Deco architectural styling of the adjacent main terminal.

Kanter designed the entire lighting system to operate at 70 to 80 percent of full brightness. He expects the overcapacity design to provide substantial long-term savings on operating and maintenance costs. "When cold cathode lamps operate at reduced voltage and current, their mean expected life of 35,000 hours is considerably extended, as is the life of the transformers," he says.

As the lamps age and suffer lumen depreciation, a single dimmer can be adjusted upward to maintain optimum light levels. Lumen maintenance is especially important for the 70 cold cathode lamps on the project, because they provide the corridor's ambient light. Unlike fluorescent lighting, the cold cathode system requires no special dimming ballasts.

"Airport engineers should be going back and adjusting the dimmer," says Kanter. He



Section through lighted glass block wall

admits, however, that the system may not get this attention over the years. "I'd say that it's likely to happen when we're called to service the system for one reason or another — either because construction requires us to remove a section of tubing, or because a transformer fails."

Even though the design provides for access, fixtures within the wall will take more time to relamp than would bare or recessed fixtures. Fortunately, Kanter expects that relamping will probably be necessary only once every five to seven years. At that time, he recommends that all 70 cold cathode lamps be manufactured to original patterns and replaced at one time, ensuring that uniform color rendering and brightness continue to make the concourse easy on the eyes. ■

For product information, turn to page 70 and see Manufacturers.

Show us your favorite landscape lighting project: Here's how

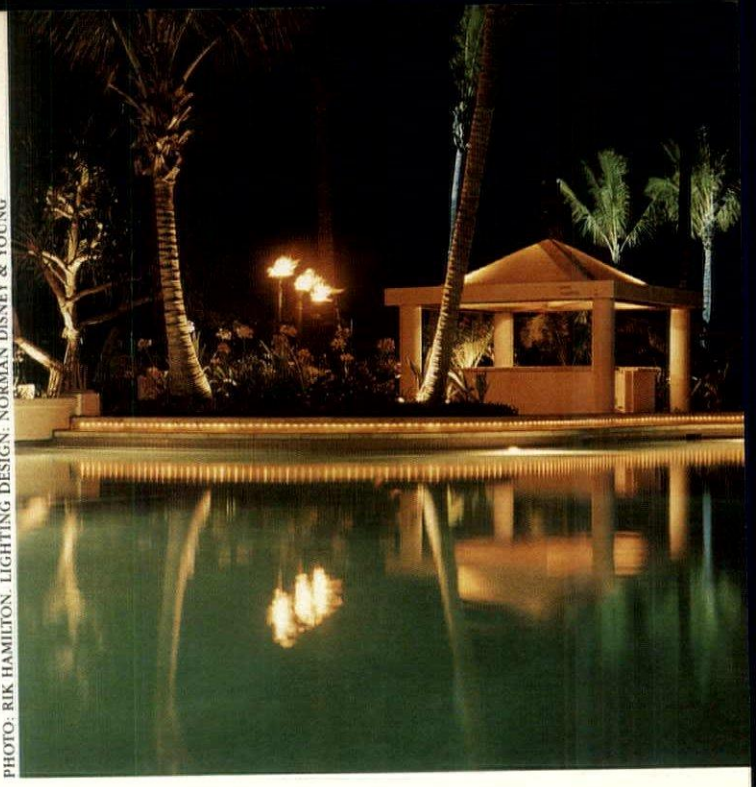


PHOTO: RIK HAMILTON. LIGHTING DESIGN: NORMAN DISNEY & YOUNG

It's easy to have your project considered for publication. You don't have to be a writer, but you do need to send enough information to let us "visit" the lighting project.

We want to see creative solutions to indoor and outdoor lighting problems, everywhere and anywhere a lighting problem has been solved with creativity, practicality, and innovation. We're interested in both electrical lighting and daylighting.

To make a preliminary evaluation, we need photographs and a brief written description.

Photographs

Sharp color transparencies focused on the lighting achievement are the next best thing to giving the editorial reviewers a tour of your project. Our first choice is 4×5 color transparencies, but we also accept 2¼×2¼ transparencies and 35mm slides. We prefer to review original slides or transparencies; we cannot review color negatives.

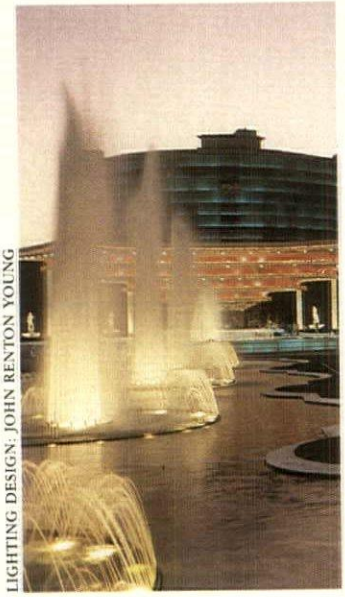
If your professional photos were originally shot as color negatives, please send full-frame prints. We prefer the following enlargements: 4×5 contact prints; 4×4 prints from 2¼×2¼ film; and 5×7 prints from 35mm film.

Be sure to provide the photographer's name and phone number, and indicate who owns publication rights. We return all photos promptly after review or publication.

Written description

Our editorial reviewers focus on information, not presentation; factual details are much more important than writing style. The best write-ups briefly describe the lighting design problem and the way it was solved, explaining the story behind what we see in the photos.

Objectives and scope. A brief statement about the effect the designer was after helps us evaluate whether and how well the objectives were fulfilled.



LIGHTING DESIGN: JOHN RENTON YOUNG

Philosophy. What broader, basic beliefs about what lighting should accomplish for the end user influenced your design objectives? Was the lighting solution chosen primarily for aesthetic effect? User comfort? Energy efficiency? Or for other reasons?

Calculations and planning. What did you do that might help our readers to approach their own work in some new and productive ways? Have you created or discovered a way to predict lighting results?

Light sources and luminaires. Why did you choose the particular lamps, luminaires, and/or glazing used in the project? What custom design or architectural detailing was involved?

Drawings

Drawings are optional. Include sections or details that illustrate the lighting achievement and any special luminaires, installations, or other notable features. If you send a reflected ceiling plan, please send an elevation with it.

The Review Process

Upon reaching our offices, your project submission enters our editorial review process. We send you an acknowledgment letter and circulate your submission among our reviewers. Usually, you can expect to hear from us within four weeks.

When a project is selected for publication, we usually request more information about the design team and your selection of light sources and luminaires. We may arrange a brief telephone interview to discuss design issues.

Finally, we offer contributors an opportunity to review article manuscripts so that we can correct any factual errors before publication.

Time to Publication

If the materials you submit for review are complete, and if the review and development processes are completed without any difficulties or delays, it is possible to rush a project into print in about 10 weeks. Typically, the time to publication — that is, from the time a designer submits materials for review until the published article is mailed to readers — is four to five months. If projects are complex, require additional art or photography, or are chosen to be cover stories, the total time to publication may be six to nine months.

To talk about your project or get more information, telephone our editorial offices at **(503) 343-1200.**

Send project submission materials to
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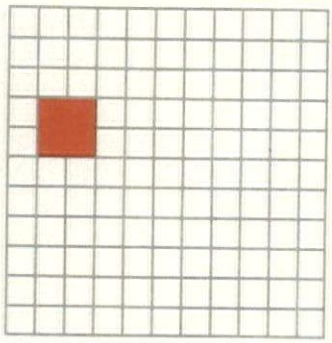
Software Reviews



New Autodesk rendering program

David Lord, PhD

David Lord is a professor of architecture at California Polytechnic State University, San Luis Obispo.

This month we look briefly at software from Autodesk and focus on its new rendering program, AutoShade. The Autodesk programs allow designers with microcomputer work stations to convert three-dimensional line drawings into realistic pictures that show perspective, surface shading, and specular reflection.

Autodesk's best known product, AutoCAD, is the centerpiece of a family of computer-aided design (CAD) software products for desk-top computers and work stations. The capabilities of AutoCAD have grown tremendously since its introduction in 1982; it is now one of the most powerful CAD programs for the microcomputer.

More important, now that more than 100,000 users have installed the program, AutoCAD drawings provide a common digital language for communication among architects and engineers. AutoCAD is supported by hundreds of third-party applications programs, including lighting calculation software.

Other Autodesk products include AutoSketch, a low-cost, full-function precision drawing tool; the AutoCAD AEC series, which adapts AutoCAD to the specific needs of architecture, engineering, and construction offices; the Engineer Works, a solid modeling program; and CAD/camera, a program that facilitates the automatic transfer of paper drawings to CAD data bases.

AutoShade, the latest Autodesk software package, makes the series even more interesting and relevant for lighting designers. AutoShade is a full-color rendering package that turns AutoCAD drawings into three-dimensional, shaded images. AutoShade is a post-processor for AutoCAD; that is, it is used after creating an AutoCAD drawing in the normal way. AutoShade brings the typical wire frame microcomputer CAD image into the more realistic world of light and shadow, shade and reflection.

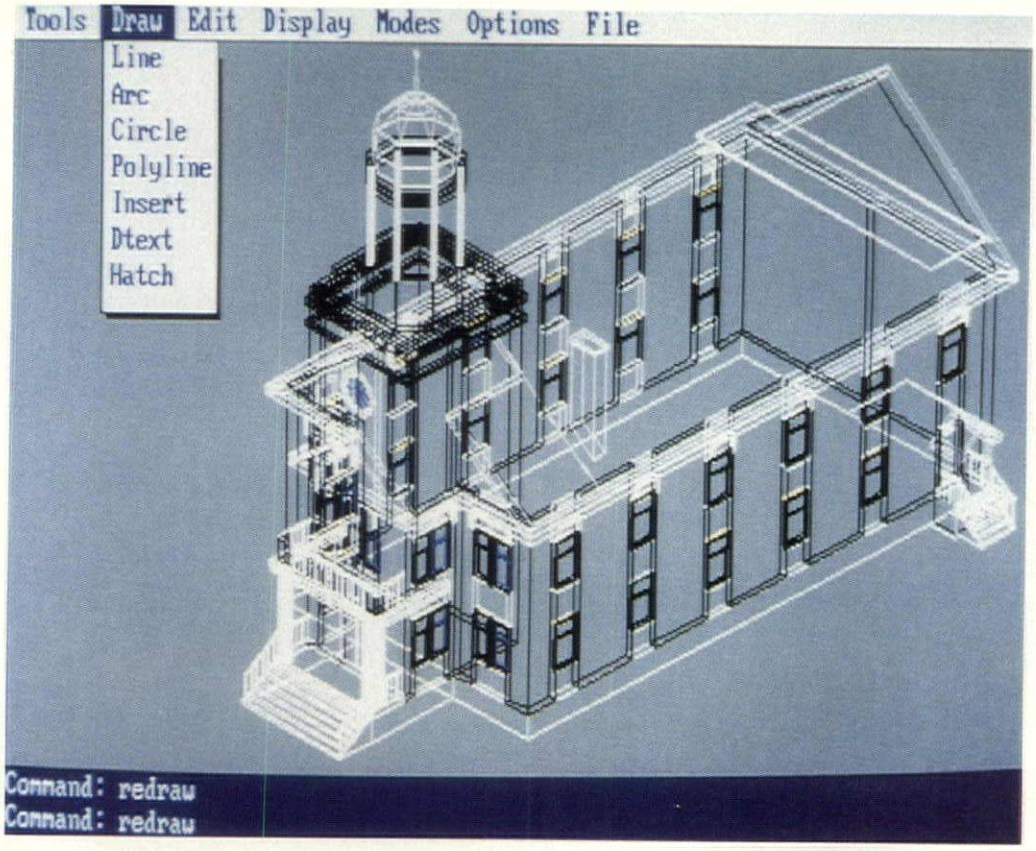
Rendered images generated by AutoShade can be used as an integral part of the design verification process. Surface shapes and features become clearly visible. Designs can be previewed for overall appearance and continuity prior to construction or manufacture. Any design that benefits from building three-dimensional models is a good candidate for AutoShade. This program will probably reduce the need for building models to simulate architectural spaces.

The easiest way to conceive of an AutoShade rendering is to imagine a photographer's studio, equipped with lights and cameras. The preliminary drawing is prepared within AutoCAD, where the number and position of lights and cameras is specified.

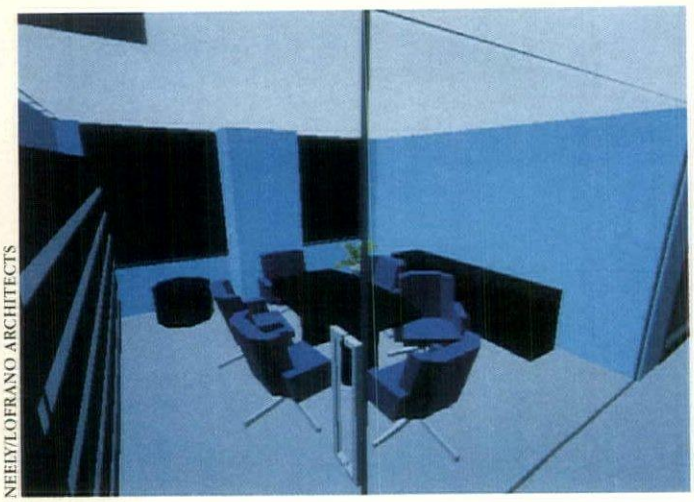
By drawing objects in different colors in AutoCAD, you can later obtain multicolored AutoShade renderings. Once the drawing is complete, a "snapshot" is taken. Since you can use any number of cameras, you can create a series of renderings from different vantage points.

To take the analogy of the photographer's studio further, you can specify different "lenses" in millimeters for the cameras. To zoom in on an object, you might select a 200-millimeter lens; for a wide-angle view, you can use a 20-millimeter lens.

AutoShade uses a technique called faceted shading, which generates renderings in 16 shades of gray or 256 colors,

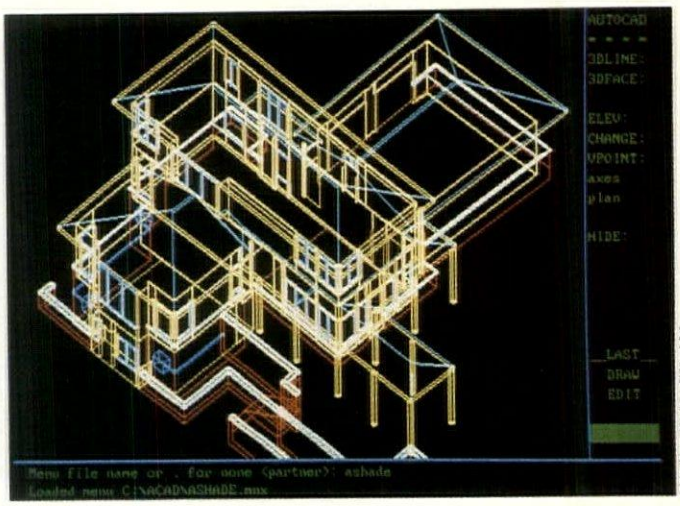


An example of the pull-down menus and three-dimensional design capabilities of AutoCAD release 9.



NEELY/LOFRANO ARCHITECTS

An eye-level view of a glass-walled conference room in a San Francisco office building under construction.



MARK CROSLEY, AIA

A working AutoCAD drawing created with AutoCAD's three-dimensional design capabilities.

depending on your graphics adapter. If your color graphics adapter produces a larger palette, AutoShade will use that capability.

The latest version of AutoCAD, release 9, has a new series of pull-down menus that give it a friendly Macintosh feel. AutoShade uses similar pull-downs as well as pop-up menus and dialogue boxes, which make it easy to use. The slight difficulty for me was in having to use the cursor keys for pointing, as I didn't have any of the three listed pointing devices.

The fully shaded perspective rendering process took a long time on my older IBM XT machine, even with the 8087 math coprocessor. I can imagine, however, that it would be quite fast on a newer machine.

Featured programs

AutoCAD, $2,850
AutoShade, $500
AEC architectural, $1000
AEC mechanical, $500
AutoSketch (8087 version), $99.50

Requires an IBM PC/XT/AT or 100% compatible system; 640K RAM; 8087, 80287, or 80387 math coprocessor; 1.2 megabyte floppy disk drive; 20 megabyte hard disk. Because AutoShade runs in conjunction with AutoCAD version 2.6 or later, the computer options are, with the exception of the display, identical to those for AutoCAD. Typical display options include IBM Professional Graphics Controller (PGC), IBM Enhanced Graphics Adapter (EGA), and IBM Color Graphics Adapter (CGA). Output options include PostScript laser printer.

Autodesk, Inc.
2320 Marinship Way
Sausalito, CA 94965
(415) 331-0356 or (800) 445-5415

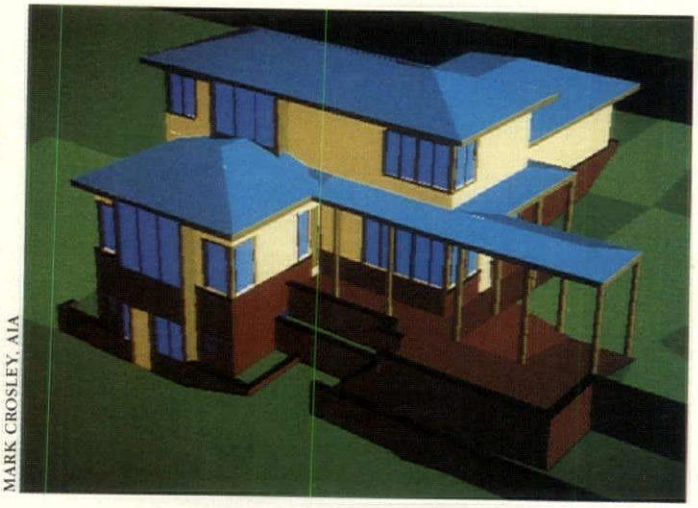
Because thousands of refinements are possible for each rendering — angle of view, position of lights, quality of surfaces, for example — I frequently used the wire frame command to check the camera position and target, as well as the positions of light sources. The fast shade command creates a high-speed rendering by performing all but the most complicated calculations, such as those to display face intersections. I only used the shade command after all settings were checked with the faster commands.

As I gained confidence in using AutoShade menus, I called up the Expert Menu. It includes a number of refinements that gave me greater control over the more complex AutoShade functions. For instance, I was able to adjust both the ambient light falling on a surface and the diffuse and specular reflections from that surface. The specular exponent setting is used to control the width of the beam of light reflected by a shiny surface — the more polished the surface, the narrower the beam of light. The art of making realistic pictures on the display monitor lies in the skillful combination of light sources and reflections.

After I achieved the views and perspective renderings I was looking for, I tried the replay command, which allowed me to quickly redisplay a rendering file without going through the lengthy shading process each time an image is viewed. A replay script can be written that presents a series of views of an object or a simulated walk through an architectural space. Using replay, the designer can create a slide show of proposed designs on the computer display.

AutoShade makes the Autodesk software series more interesting and relevant for lighting designers.

AutoShade's ability to form stereo pairs on the display monitor was interesting to experiment with. Those who have looked at stereo images using the crossed-eye fusion technique will be able to project renderings and view



MARK CROSLEY, AIA

This drawing was created with AutoCAD and rendered with AutoShade.

them in stereo on the computer monitor. The comprehensive AutoShade manual covers the details of this technique as well as providing brief tutorials on perspective rendering and shading.

AutoCAD is supported by hundreds of third-party applications programs.

Those inclined to experiment with New Age computer graphics can use AutoShade to generate a full-color fractal map of the Mandelbrot set based on geometries found in naturally occurring patterns (for more information on this technology, see *Byte* magazine, December 1986). When you want to print out the results, the most practical way to make full-color hard copies is photographically; for shaded gray renderings, most practical is a PostScript laser printer.

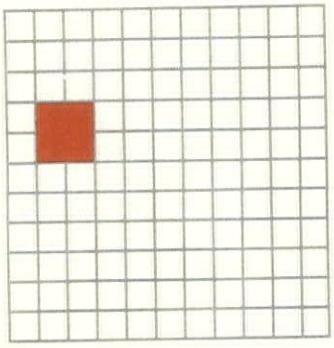
If you are interested in CAD but reluctant to take the plunge, you may wish to try AutoSketch, another program in the Autodesk series. At $79.95, the least expensive (and slowest) version is a good way to test the CAD waters without making a large investment.

Software Received for Review

The following programs have been received for future review: Light & Easy, from R.L.H. Lighting Consultants, Raleigh, North Carolina; LUX2, from Gardco Lighting, San Leandro, California; Micro-DOE2, from Acrosoft International, Denver, Colorado. ■

The Software Reviews columnist welcomes reader comments. Write to David Lord, Architecture Department, Cal Poly, San Luis Obispo, CA 93407.

Lighting Graphics



The distribution of brightness in architectural space

Sam Mills, AIA, IES

Sam Mills is an architect and lighting consultant with his own firm in Oklahoma City. His column offers graphic design ideas and architectural data selected to help coordinate lighting and architecture.

The design of lighting systems for architectural space must provide for the fundamental needs of human vision and activity. This requirement, however, neither dictates a specific solution nor limits the designer's aesthetic control over the luminous environment. Lighting for specific seeing tasks can be provided in many different ways, from a solitary spotlight to a general system that provides illumination over an entire building.

Architectural lighting can also be characterized, strictly from an aesthetic point of view, as the creative composition of lighted architectural surfaces. The visual impression of these illuminated surfaces influences our subjective interpretation of space and, in turn, modifies our emotional and motivational response to the luminous environment. It is this aspect of lighting that fascinates and challenges the lighting designer.

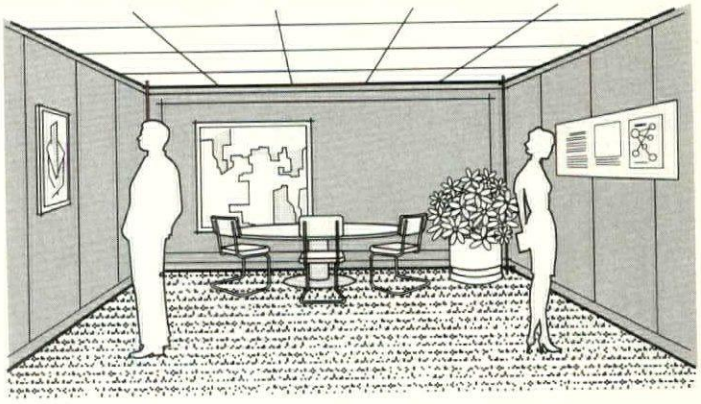
Research and practical experience suggest that aesthetic and motivational responses to these compositions of lighted surfaces are, to a degree, predictable. This column will attempt a very brief review of this interesting and disappointingly incomplete body of information.

Contemporary architecture uses a variety of forms and surfaces to define the visual limits of space. They may incorporate the fabric of the building itself or be nonstructural elements superimposed upon a space. Changes in the concentration of light or the general characteristics of distribution affect our subconscious response to these lighted forms and surfaces. In architectural design, these elements are often conceived as prominent or subordinate visual patterns; achieving the design objectives depends upon their composition and relative brightness.

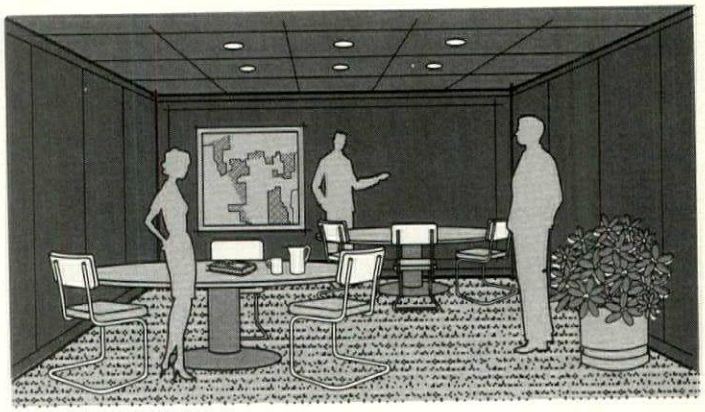
The accompanying illustrations are graphic representations of luminous environments with simple distributions of brightness. They are intended to identify a preliminary range of visual impressions that result from surface illumination patterns in architectural spaces.

The composition of lighted surfaces influences our interpretation of space.

The top illustration represents a room with a uniform distribution of brightness, like that we would expect from a full luminous ceiling and low



Uniform distribution of brightness and the low-contrast environment.



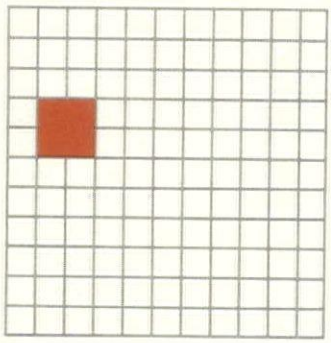
Nonuniform distribution of brightness and the high-contrast environment.

pigment contrast between the major surfaces. This results in an interior environment similar to that of an overcast day outdoors. Few highlights and shadows are present, and the distribution of light is very diffuse. Although those factors contribute to a general impression of spaciousness, they also contribute to the lack of visual interest and a diminished sense of well-being. This has also been described as a sense of *spatial somberness.*

The second illustration simulates a high-contrast environment with a nonuniform distribution of brightness. The more concentrated patterns and distribution of light create more shadows and modeling, improving the perception of forms and objects in the room. Because of the emphasis on horizontal surfaces and the relative brightness of the central area, people and activities are the dominant features; the architectural space is of only secondary interest.

In both of the spaces illustrated, the quantitative illumination at 30 inches above the floor could be identical. The different visual impressions are dependent primarily upon the distribution of brightness. Future columns will describe other interior environments that are visually and psychologically shaped by different distributions of brightness. ■

The Lighting Design Professional



HID lamps: Can't live with 'em, can't live without 'em

James R. Benya

James R. Benya is senior principal and CEO of Luminae-Souter, San Francisco. He is on the faculty of California College of Arts and Crafts, is active in IES and Designers Lighting Forum of Northern California, and teaches lighting design classes for the ASID, IBD, and AHLI.

Ever since the Arab oil embargo of 1973, architects and engineers have been seeking design opportunities to replace traditional low-efficacy lamps, such as incandescent and tungsten halogen, with longer-lived, higher-efficacy lamps. Fluorescent lamps are fine, but require a tubular shape of some sort, regardless of how compact. To be suitable for many applications, a lamp needs to be more of a "point source" than fluorescent can be. Also, most fixtures require a greater lumen package than even the most powerful compact, double twin-tube fluorescent can muster.

The search leads directly to high intensity discharge (HID) lamps, several families of compact arc-tube, high-efficacy lamps capable of generating a lot of light in a small area. The very long life of most HID lamps makes them ideal for many applications — from roadway lights to stadium lights — that require minimum maintenance, very few fixtures, and high energy-efficiency.

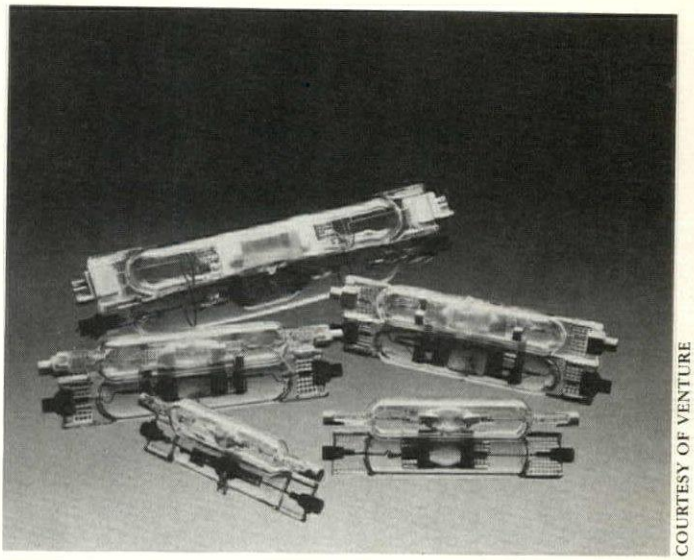
HID lamps are high-technology, temperamental devices that require unusual care in selecting and specifying.

Instead of an incandescent filament, the light source within an HID lamp is a sealed arc tube. The new low-wattage and specially designed "short arc" lamps have smaller, shorter arc tubes that more closely approximate a point source. Highly efficient reflectors with superior beam control can be designed for lamps such as the metal halide lamps shown here.

Unfortunately, HID lamps are temperamental high-technology devices that require unusual care in selecting and specifying. Here are concepts important to the designer who's choosing HID lamps for interior and exterior architectural applications.

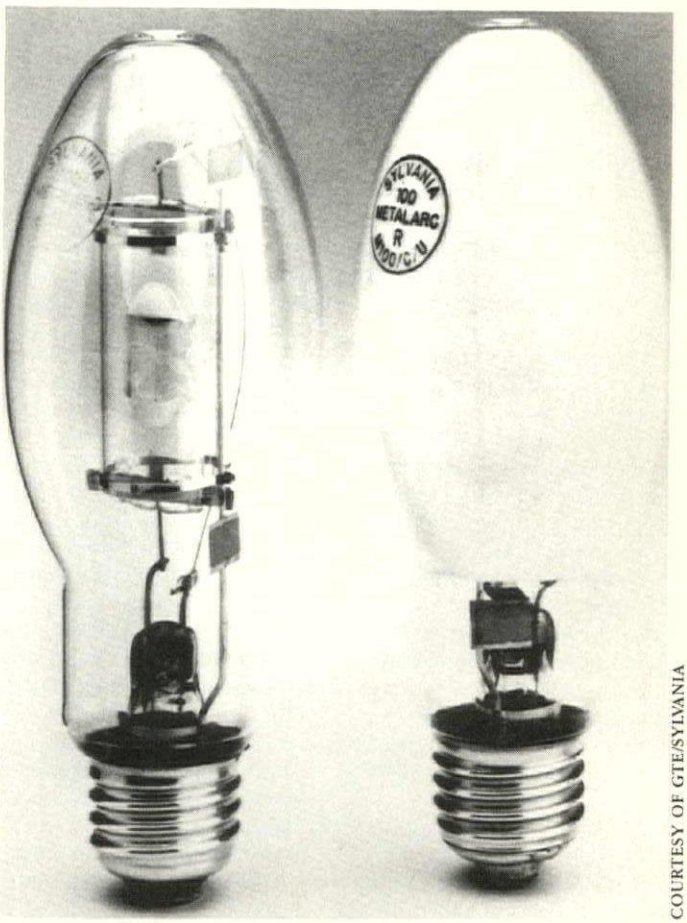
Color

Because HID lamps are discharge sources, they rely upon the spectral emission produced by various metals and gases when an electric arc is sustained through them. Mercury, for example, emits certain green, blue, and ultraviolet (UV) light; sodium emits yellow light. To perform properly, an HID lamp requires a certain balance between electric arc current, heat within the arc,



COURTESY OF VENTURE

A series of double-ended metal halide lamps.



COURTESY OF GTE/SYLVANIA

Clear and coated 100-watt single-ended metal halide lamps.

amount of metal relative to the envelope of the arc, and a host of other factors. Each basic lamp type has characteristic color qualities.

Mercury vapor lamps are white light sources with a definite greenishness and bluishness to them. The best colored lamp is a phosphor-coated lamp called Styletone; it has a color temperature of about 3000 Kelvins and a color rendering index (CRI) of about 65. The worst is clear mercury, with a color temperature of about 7500 Kelvins and a CRI of only about 9.

Metal halide lamps are fairly pure, white light sources; they tend to have a slight bluish or greenish tint compared to incandescent or tungsten halogen. Most metal halide lamps have medium to high CRIs and their correlated color temperatures vary from 3000K to 5500K. There is a broadening field of choice of color temperatures and CRIs in each lamp wattage and bulb style (see The Lighting Design Professional, April 1988).

High pressure sodium lamps are golden-white light sources that sometimes look pinkish-orange. Most high pressure sodium lamps have a poor CRI and low color temperature (around 2000K), although with recent breakthroughs some shorter-lived lamps have achieved color temperatures up to 2500K at over 80 CRI.

Low pressure sodium lamps are purely yellow light sources that render no colors at all!

For demanding design applications, it is often better to choose the color first, then find a lamp to match. It is also important to remember that lamp color qualities vary significantly from wattage to wattage in the same family. Often the better color lamps are available only in certain wattages.

HID lamps can also experience color shift, especially metal halide and the improved-color high pressure sodium. This is caused partly by manufacturing variations, but primarily because of the change in lamp wattage as arc tube voltage rises over life (see ballasts). This color shift can be readily apparent where lamps or their reflections are immediately adjacent, as in indirect office lighting. The only known "cure" utilizes electronic ballasts to regulate arc voltage.

Warm-up, Restrike, Position

Being high-pressure lamps, HID sources require a relatively long warm-up time when turned on. The more compact arcs seem to take less time, and the sodium lamps generally take less time than metal halides. There is no practical way to change the process.

Of much greater concern, however, is the restrike period, the amount of cooling-down time that an extinguished HID lamp needs before an arc can be restruck. Even a very short power interruption can initiate the restrike process, which can take up to 15 minutes for metal halide lamps.

To circumvent this problem, it is possible to hot-restrike an HID lamp, using an ultrahigh voltage pulse to overcome the intense heat and pressure and get the lamp going again. Hot restriking involves special lamps and ballast circuits, making it unsuitable for most situations. A more standard measure is to provide a quartz auxiliary lamp, designed to operate whenever the HID lamp does not. Needless to say, HID operations do not lend themselves to manual switching in offices and schools.

Most HID lamps are fairly insensitive to operating position. But the best colored lamps, metal halides, are position-sensitive; that is, they are limited to a specific base orientation. Some lamps, for example, will operate properly only with the base down, while a similarly rated and apparently identical lamp operates properly only with the base up. Lamps are rated (with the rating shown as part of the model number) as to their designed burning position. This is because the metals condense into pools when the lamp is cold, and the proper process of metal vapors being heated and rising into the arc is critical to both color and lamp life. Improper position can harm both life and color.

Even when operated in a proper position, metal halide lamps can experience color stratification of the arc. Gravity causes the superheated metals in the arc to stratify by weight, so it can only be cured by a reflector or fixture that mixes the output light prior to directing it toward the target. A sports light fixture that does not remix the light can have a shift of over 4000K from the beam center to 10 percent candlepower.

Ballasts

With the exception of a few self-ballasted lamps, HID lamps require ballasts to operate. Most ballasts are magnetic core-and-coil, including reactors, autotransformer regulators, lead-peaked ballasts, and the like. Detailed descriptions of the various types and their individual differences are in the *IES Lighting Handbook.*

Designers must first specify the proper input voltage to the ballast. Then they need to consider any certain advantages of one type, such as regulator, over another; fixture manufacturers usually supply the ballast most often preferred. An often overlooked specification is ballast noise. Ballasts called *silent pack* are premium wound to run cooler and quieter and are potted or otherwise acoustically dampened. These should be specified for interior, low ambient noise environments. An alternative is to remove the ballast from the acoustic space of the lighting. Metal halide and mercury are best for this; their ballasts can be several hundred feet away from the larger standard lamps.

Be wary of using power line carrier (PLC) control systems in buildings with a lot of HID lamps. The ballasts' power factor correction can sometimes short out the PLC signal.

Solid-state ballasts have yet to be successfully implemented in large volume because HID lamps can be sensitive to mechanical resonance at high operating frequencies. The very high flicker content of HID lamps is cause for concern, however, and solid-state operation may be the only practical cure.

Dimming, Wattage, Lamp Life

Dimming. Because HID lamps are optimized to operate at a certain temperature and pressure, dimming causes them to operate comparatively poorly. The efficacy of the lamp suffers the most, and at 50 percent power the lamp generates only 25 percent light. Moreover, an unnatural color shift usually occurs, making metal halide appear more like clear mercury vapor and high pressure sodium appear like low pressure sodium. The response speed of the dimming is quite slow, and dimming equipment is very expensive.

Lamp shapes and wattages. As with any lamp, HID lamps with larger wattages use larger bulb shapes. It is possible, however, to make more compact lamps. The larger lamps have borosilicate glass (hard Pyrex) bulbs that, in the case of mercury vapor and metal halide, absorb the intense ultraviolet generated by the arc. New compact metal halide

What's coming in HID lamps?
Some of the following developments are already nearing readiness for entry to the marketplace.

☐ *Better color rendering.* Solid-state ballasted low-wattage metal halides are coming with a color temperature of 3000K and a color rendering index (CRI) above 80. They'll maintain color over a rated life of 7500 hours without lamp-to-lamp or aging shift.

☐ *New phosphor coatings.* A series of metal halide lamps with phosphor coatings are being designed to match popular fluorescent lamp colors.

☐ *Color for the life of the lamp.* Deluxe color (2400K, 65+ CRI) high pressure sodium lamps are on the way; they will last until their color begins to fail, then extinguish.

☐ *Less need for shielding.* Metal halide PAR lamps will come in lower wattages to make fixture design much easier and eliminate the problems of UV shielding.☐

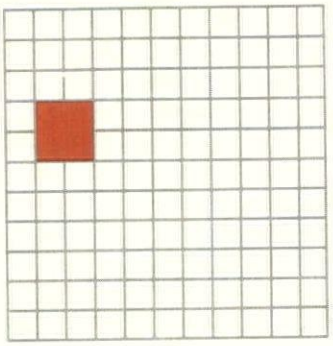
lamps, however, have quartz glass (soft, high-temperature) bulbs that pass the UV on through; they require an enclosure with electrical interlock to prevent accidental UV exposure.

Designers can also choose from a few variations in lamp configuration and base. Traditionally, HID lamps were available only in mogul-base large lamps; but now quite a range of bulb shapes is available, from tubular recessed single-contact double-ended lamps to medium-based PAR lamps. In fact, newly released single-ended bipin metal halide lamps look a great deal like studio-type halogen lamps of an equivalent lumen output.

Lamp life. Most HID lamps experience lives longer than 10,000 hours. Mercury vapor lamps will last virtually forever, with the light gradually fading to nothing. Most of the other lamps start cycling on and off to advise of impending end of life. "Nonpassive end-of-life" — a techno-euphemism for blowing up — is rare; it seems to be confined to metal halide lamps that are never turned off. But it also appears that manufacturers' lamp life claims are often inflated. In many instances, it is prudent to design for 50–60 percent of the rated life.

The lamp industry is aware not only of the potential of HID lamps, but also of their problems. Changes in the last decade alone have been monumental. In the future, as can be seen in the accompanying chart, we can look forward to several developments that are already close at hand.■

Daylighting Techniques



Glass block daylighting, open and private

Mojtaba Navvab

Mojtaba Navvab is an assistant professor of architecture in the College of Architecture and Urban Planning at the University of Michigan, Ann Arbor.

The main purpose of daylighting design is to select a daylighting system that takes advantage of outside conditions while providing a comfortable interior environment. Today's technology provides many mechanisms for introducing light into buildings. This column discusses the use of glass blocks in daylighting systems and provides detailed information about their light and heat transmission characteristics.

Designers can use glass blocks effectively to create a flexible or adaptive daylighting system that controls light transmission into a building or from one space to another. With glass blocks, designers can achieve an open look, eliminating opaque barriers while retaining visual and acoustic privacy.

Glass blocks come in a variety of shapes, including those suitable for curvilinear structures. Architects and designers have taken some of these capabilities into account and used glass blocks in a variety of indoor and outdoor applications in different kinds of buildings. The concourse at Washington National Airport and the lobby of the Holiday Spa (both featured in this issue) are two examples of controlling the transmission of light between interior spaces.

Depending on their surface patterns, glass blocks can be either transparent or translucent.

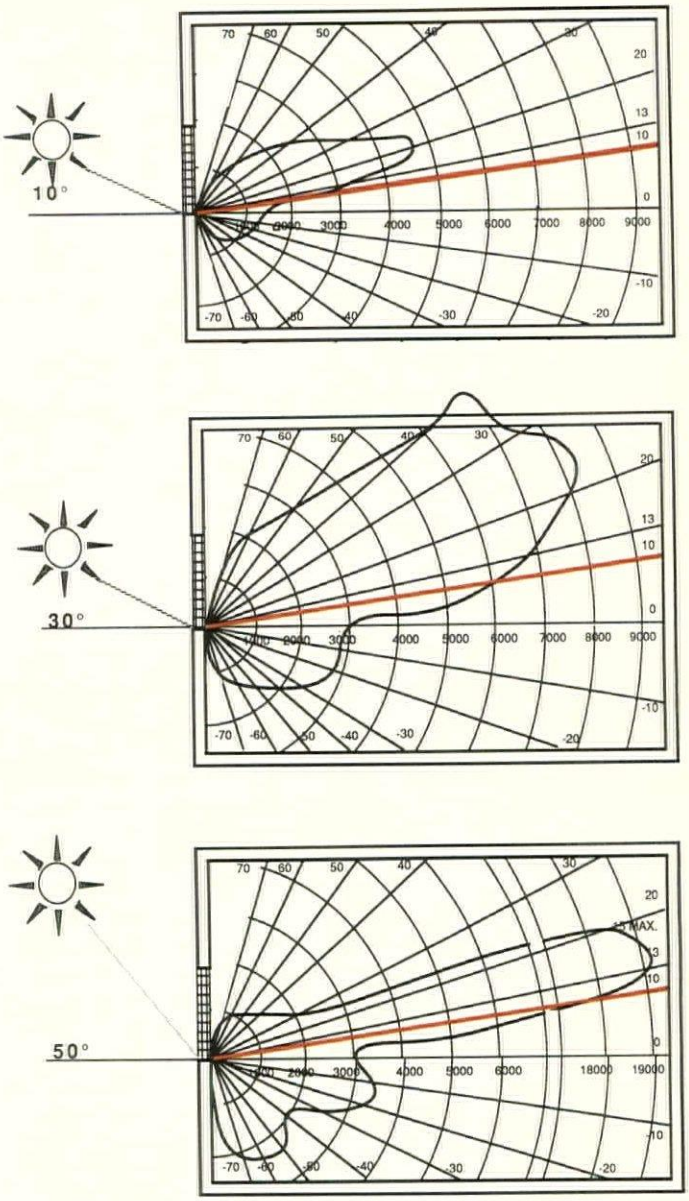
Depending on their surface patterns, glass blocks can be either transparent or translucent. Translucent materials scatter or diffuse light, and they limit or block visibility (see Daylighting Techniques column, May 1988). Glass blocks are made of two halves of pressed glass joined together; the glass pattern is designed to diffuse light. Because of the partial vacuum inside, they provide a U-value equivalent to that of 12-inch-thick concrete.

Glass blocks are used for many reasons. They provide high resistance to the travel of sound and spread of fire, they reduce condensation in high-humidity interiors, and their insulating properties can help to reduce heat loss or gain. They come in a varied range of patterns and sizes that, when applied properly, provide light reflection without glare.

Photometric Studies

A few studies have measured how glass block transmits light and how its surface reflects sunlight. In studies conducted by Paul Hugh at the University of Michigan, researchers studied daylighting for school classrooms. Working under clear sky conditions, they measured the brightness (luminance) of a glass block window in a classroom in units of luminance (footlamberts) for sun altitudes of 10, 30, and 50 degrees. The data are presented in the form of a *luminance distribution* plot, which shows the magnitude and direction of the transmitted sunlight and skylight from different viewing angles. This form of data presentation provides designers with detailed information about the luminance distribution inside spaces that use glass blocks.

The plots show that the magnitude of the brightness varies as a function of the



Luminance distribution for a clear glass block window with the sun at three altitudes: 10, 30, and 50 degrees.

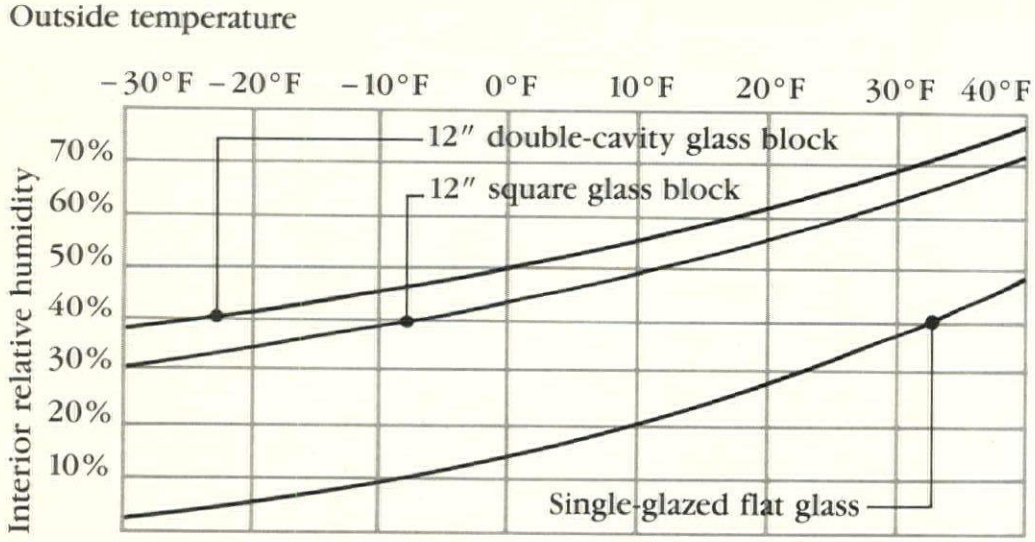


Chart showing glass blocks' resistance to surface condensation is based on an inside temperature of 70 degrees Fahrenheit (source: Pittsburgh Corning Corporation, 1987).

sun's altitude. Assuming the glass block as the light source, the hemispherical coordinate is in front of the source. The glass block transmits light toward the ceiling. The brightness (luminance) ratio of the window with glass block in the lower quarter sphere is roughly one-fifth the ratio of the upper quarter sphere. This indicates that the horizontal mortar joints between the blocks act as small shading devices, such as small fixed louvers, thereby reducing the brightness (illuminance) from the lower viewing angle.

The luminance distribution of a clear glass block with the sun at 10-, 30-, and 50-degree altitudes shows the magnitude and direction of the light from the sun and sky that is transmitted through the block. Designers can easily read the magnitude of luminance in a given direction at the point where the radial line for that direction or altitude intersects with a curved grid on the chart. The brightness readings for a 10-degree viewing angle with respect to the horizon line in the room for sun at altitudes of 10 degrees, 30 degrees, and 50 degrees are 3000, 6000, and 18,000 footlamberts, respectively. Light transmission can be controlled by the selection of glass patterns that eliminate hot spots and therefore reduce glare.

South-facing glass block functions in the same way as other south-facing exterior windows or daylighting systems. During winter days, the glass blocks transmit sunlight energy through the blocks because of the lower sun angle. On summer days, however, when the angle of the sun is high, the mortar joints between the blocks act as a shading system.

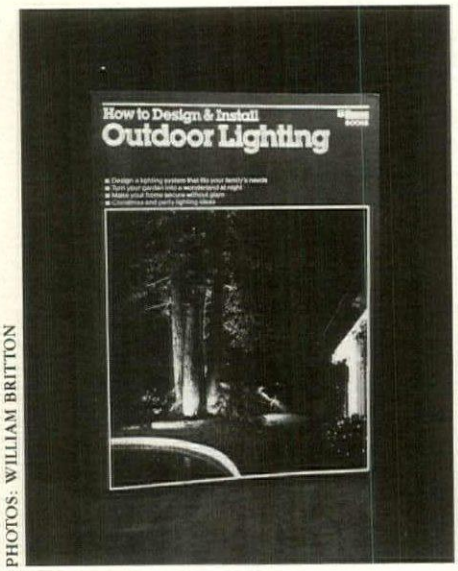
The air space inside glass blocks provides a high insulating value. Thermal performance varies, depending upon the effects of various coatings on visible light transmittances, U-values, and shading coefficients of glass blocks.

Glass blocks resist surface condensation. The accompanying graph indicates that to form condensation on a double-cavity 12-inch-square glass block takes an outside temperature of minus 23 degrees Fahrenheit when the inside space is at a temperature of 70 degrees Fahrenheit with 40 percent relative humidity. In contrast, at the same inside temperature and humidity, condensation forms on single-glazed glass when the outside temperature at 33 degrees Fahrenheit.

Daylighting is not a substitute for electrical lighting, to be sure. But designers who have a basic understanding of daylighting system performance have a competitive edge in these energy-conscious days. They will be able to find more opportunities to lower the demands on other building systems while they enhance the quality of light in interior spaces. ■

The daylighting columnist would like to hear from readers about unique daylighting applications. Write to Mojtaba Navvab, MIES, College of Architecture, University of Michigan, Ann Arbor, MI 48109.

Book Reviews



PHOTOS: WILLIAM BRITTON

Wilson's book contains all the information a novice lighting designer needs to plan an outdoor lighting system.

How to Design and Install Outdoor Lighting, by William H.W. Wilson. San Francisco: Ortho Books, 1984. 96 pages.

Lighting designers often complain that it's hard to find a good introductory book on lighting design. *Architectural Lighting* gets so many requests for more information on landscape lighting, one might expect that a good beginning book on outdoor lighting systems would also be hard to find. Fortunately, such a book exists. What's more, it is readily available at many hardware stores and nurseries; it is among a series of do-it-yourself books published by Ortho, a maker of agricultural chemicals.

Although Wilson's book was written for homeowners, professional designers will find it a useful reference work.

Although it is written as a self-help guide for homeowners, professional designers will find this a useful basic reference book. In fact, a landscape lighting designer told this magazine's editors that she uses it as a required text in her landscape lighting courses. It contains all the information a novice lighting designer needs to plan an outdoor lighting system. Four chapters cover general outdoor lighting principles, tools and techniques, planning a lighting system, and installing and maintaining the system. Clear, practical instructions guide readers through the entire design and installation process.

The book's first chapter introduces readers to basic design principles and terminology. A page-long vocabulary list near the beginning of the chapter defines many commonly used terms in lighting design, such as *lamp, glare, high intensity discharge lamp,* and *reflectance.* Thus armed, readers should have little trouble understanding the subsequent discussions of lighting effects and system design.

Thoughtful, practical advice abounds. In discussing brightness levels, for example, the writer notes, "When garden lighting is too bright, problems can arise with glare unless the fixtures are extremely well shielded, and the brilliant light may bother neighbors." Wilson also tells readers that lighting designers and electrical contractors "can be especially helpful in designing and installing complete systems with sophisticated controls, but they can assist on smaller projects as well." He advises readers to learn all they can about outdoor lighting even if they plan to hire a designer; many designers, he says, have had far more experience with indoor lighting systems than with outdoor ones.

The second chapter thoroughly discusses lighting effects and the fixtures that produce them. An excellent survey of 21 lighting effects uses captioned color photos of applications with drawings that illustrate fixture placement for projects that range from downlighting for a garden path to underwater lighting for swimming pools.

That chapter also includes an eight-point comparative analysis of low-voltage and standard-voltage lighting systems and a discussion of lamp types and lamp characteristics. The section covers 11 kinds of fixtures — from well lights to pool lights — and other system components, such as ground fault interrupters and dimmers. It also includes color photos of fixtures and components with explanations of their functions. The chapter concludes with a section on the use of colored sources in outdoor lighting.

Planning is the subject of the third chapter, which offers specific suggestions and illustrative photos for applications such as lighting driveways, illuminating special plants or objects in a garden, and lighting for special occasions. Designing an outdoor lighting system is outlined in nine clear steps; it first asks readers, "Why are you lighting?"

A series of questions helps readers determine which areas they want to light and the effects they want to create. The questions touch on such topics as favorite garden features, nighttime uses of the outdoor spaces, and safety and security requirements. The process continues with advice on making a base plan and a site plan, establishing lighting priorities, testing out lighting effects, calculating power needs, choosing materials, finalizing the lighting plan, and, if needed, having the plan checked by an electrical contractor and the local building inspector.

The final chapter covers system installation and maintenance, discussing standard-voltage and low-voltage systems separately. Step by step, it describes and illustrates the process for installing each kind of system — from getting necessary permits to testing the system and cleaning up. Safety precautions abound throughout the discussion of installation, which includes a section devoted to safe outdoor wiring. The concluding section on system maintenance brings the process of system design and installation full circle with its final emphasis on planning for maintenance from the beginning.

The book's appendix contains information that readers will appreciate, including a glossary of technical terms used in the book. Troubleshooting sections on both 120- and 12-volt systems suggest causes for and solutions to a number of common problems. A miniguide to 11 categories of plants for lighting, organized by dominant plant characteristics, contains suggestions for lighting various kinds of plants; it also lists typical plants in each category.

Besides being informative and generously illustrated, the book is written in a style that never talks down to or over the heads of its readers. It provides practical information that intelligent nonspecialists can apply to their own situations, and it can function equally well for professionals as a springboard for new design ideas.

—Susan R. Degen

Susan Degen is assistant editor of Architectural Lighting.

***How to Design and Install Outdoor Lighting*, $6.95 (paper)**

Mail orders should include $1 for postage and handling.

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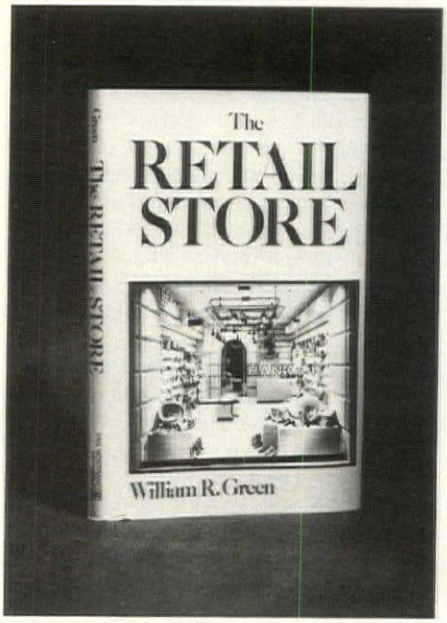

One chapter in Green's practical book is devoted to lighting.

The Retail Store: Design and Construction, by William R. Green. New York: Van Nostrand Reinhold Company, 1987. 240 pages.

Like flowers that bloom and quickly fade, the retail store has one of the shortest lives of any type of construction. More construction dollars per square foot are spent on retail stores than on almost any other building type. This book is intended for the main participants in retail store design — the merchant, the landlord, the designer, and the builder — all of whom are engaged in the search for better, faster, more exciting ways to display and merchandise products.

Nowhere does the architect or interior designer play a more important role in the success of the retail store than in the design of lighting. Not only is good lighting important for product display, it also establishes and enhances the store's image. Discount stores are illuminated with harsh, diffuse, overhead utility lighting. Quality stores have glare-free, directional display illumination. Interestingly, budget-minded shoppers may sometimes pass by a store that has well-lit displays because they appear to be too expensive, regardless of the price of the merchandise.

This is a practical book that provides an overview of all the phases — programming, schematic design, and construction — in the creation of the retail store. The book is full of hints and tips and does not burrow into great detail. One of its seven chapters is devoted to lighting; in it, the reader is given preliminary information for identifying the task areas to be illuminated, for determining lighting criteria, and for selecting the best light sources.

Not only is good lighting important for product display, it also establishes and enhances a store's image.

The color, the modeling effect, and the brightness of the light source are discussed, and simple rules are given for the selection and location of fixtures. Photographs, drawings, and diagrams of actual installations make us feel privileged — as if we were looking over the shoulder of a retail store consultant. The principles here come not from theory but from practice.

Other chapters round out a comprehensive overview of the design process from start to finish. They cover the design and construction process, store image and spatial organization, product display, the storefront, materials of construction, and heating, ventilating, and air-conditioning systems. This lean volume should be on the shelf of anyone involved in the design of retail stores.

—David Lord

David Lord is a professor of architecture at California Polytechnic State University, San Luis Obispo.

***The Retail Store: Design and Construction*, $27.95**

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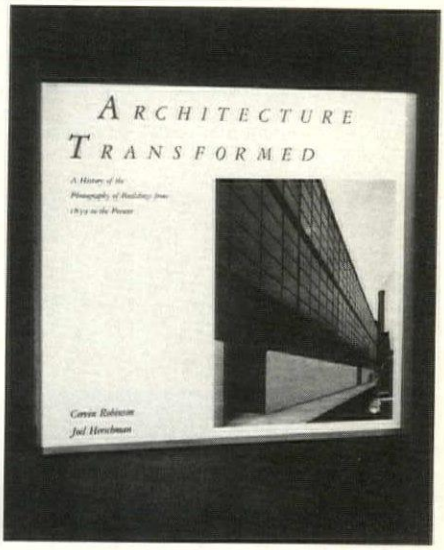

Architecture Transformed: A History of the Photography of Buildings from 1839 to Present, by Cervin Robinson and Joel Herschman. New York: The Massachusetts Institute of Technology and The Architectural League of New York, 1987. 203 pages.

Robinson and Herschman first focus on the rich history of European architecture, then shift their attention to the United States.

The 198 black-and-white architectural photographs in this book represent four stylistic periods in the history of architectural photography: 1839 to 1880, 1880 to 1930, 1930 to 1970, and 1970 to the present. The rich history of architectural development in Europe is the focus of the first two sections. In the third section, attention shifts to the United States. Herschman writes in the first section, "Essentially 1851 was the year in which

architectural photography came of age, twelve years after the appearance of the processes of Daguerre and Talbot." Robinson continues to comment in the last three sections how the advances in photographic technology and the changes in stance by the art and architectural community molded the evolution of style in architectural photography. Throughout the text there are references to the qualities of light as one of the characteristics of style.

—Jon Holmquist

***Architecture Transformed*, $50**

Mail orders should include $1.50 for postage and handling.

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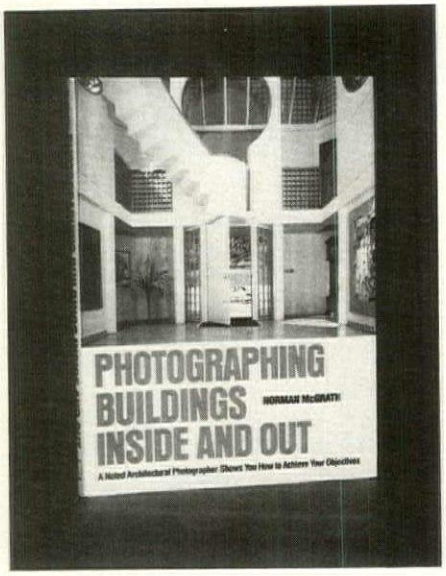

McGrath discusses working relationships between photographers and designers and outlines some common practices of magazine and book publishers that use architectural photos.

Photographing Buildings Inside and Out, by Norman McGrath. New York: Whitney Library of Design, 1987. 176 pages.

All photographers have a difficult responsibility: translating three-dimensional environments into easily interpreted two-dimensional images. They must produce an image that accurately represents the whole of a three-dimensional space by displaying only a part. Architectural photography can be even more complex: representing environments with which people are intimately familiar.

Interiors photography requires expertise in available and supplemental lighting. If the images must focus on the lighting — as is usually the case for this magazine — the photographer adds another layer of difficulty to an already complex set of tasks. Norman McGrath goes far in inspiring appreciation for architectural photographers by clearly exemplifying these complexities in his new book, *Photographing Buildings Inside and Out.*

His first four chapters cover some of the general concepts associated with architectural photography. In the last five, he puts the concepts to work in practical settings, using common architectural situations and his photographs to illustrate his approach to problem solving.

McGrath's book helps designers understand the rights and responsibilities involved when they hire an architectural photographer.

Some sections are particularly valuable for *Architectural Lighting* readers. The first chapter discusses working relationships between designers and photographers. The author explains the complexities of timing, schedules, fees, and contracts from the photographer's point of view. Insight from the photographer's perspective helps build reader respect for the numerous skills the photographer needs and helps designers understand the rights and responsibilities involved when they hire an architectural photographer. McGrath's discussion of the complex area of copyright ownership, for example, is brief but clear. So, too, are his explanations of why photographers need to understand the design objectives the client wants portrayed.

In the following chapter, he extends his discussion to the photographer-publisher relationship and outlines some common practices of the magazine and book publishers that use architectural photos. "Popular and professional magazines and newspapers each have established submission procedures, and a phone call to the editorial department may be the simplest way to find out what they are," he writes.

McGrath outlines some common practices of magazine and book publishers that use architectural photos.

When choosing what he calls "scouting" photos to submit to a publication, he admonishes readers to ask themselves, "Will an editor unfamiliar with the design be able to make a reasonable evaluation of it?" Then he points out, "Poor photos may result in premature rejection of a good project. Plans, renderings, and isometrics should be submitted in addition to photographs when available. Any material that helps to convince a publication to feature a job is relevant."

In the chapter on selecting equipment and film, the author seems to briefly lose sight of his audience. Although the first two chapters speak to aspiring professionals, who can expect to charge from $500 to $1250 a day, the third chapter seems to speak to beginning photographers; or perhaps it is intended for designers who want to attempt their own architectural documentation. He then quickly shifts back into high gear and describes the virtues of perspective-control (PC) lenses — a sophisticated subject — with only a cursory explanation of their purpose and function.

It would be useful to expand the section titled "Special Aids for Prepping the Subject," which covers some interesting specifics of architectural photography. Here he describes some of the tricks of the trade he has picked up over the years, such as using fine nylon wire to precisely position leaves and branches on exotic plants. Fortunately, however, he adds to his repertoire of tricks in the later problem-solving chapters.

McGrath devotes the fourth chapter to the highly complex subject of interior lighting. Here, he effectively addresses the difficult concept of color balance and the way it relates to the selection of

film and light sources. He meticulously describes techniques for balancing electrical light with daylight and for adding supplemental electronic flash (strobe) and tungsten lamps.

Although his descriptions are thorough as to photographing *with* and *in* light, they do not address the difficulties involved in faithfully representing light sources and luminaires when light is the subject of a photo. Although that falls into what might be called a *sub*-subspecialty of architectural photography, it is important to the readers (and editors) of *Architectural Lighting*.

He illustrates his discussion of lens selection with images of the Pyramid of the Sun in Mexico. Although the portrayal of scale is effective in this case, an interior example would have been welcome. He concludes the chapter with a four-paragraph introduction to composition, a subject on which he follows up in detail throughout the following chapters.

McGrath begins the last half of his book by describing composition and lighting techniques required for photographing domestic spaces. The descriptions accompanying the illustrations are satisfying in their detail. Occasionally, however, the photograph to which a description refers isn't immediately clear. He continues in subsequent chapters to describe techniques required to photograph workplaces, public spaces, and building exteriors, and he concludes with a chapter on how to handle special situations, such as shooting after dark and aerial photography. Again, the anecdotal references to his special tricks (such as hosing down a driveway to reduce brightness) and techniques (such as his triple-exposure approach to an office interior that required including a skyline at dusk) are most interesting.

The author is a perfectionist. He frequently points out, in retrospect, what he might have done to further improve his images. That he is confident and thorough lends credibility to what he says. Perhaps it even justifies the lack of any conclusion or summary at the end of the book as a statement of his pragmatic approach to architectural photography.

According to McGrath, "A camera guided by an artist's eye can produce images that not only fulfill the documentary objectives, but achieve a greatness not dependent on the quality of the subject matter." The book contains 190 of the author's photographs, 175 superbly reproduced in color. After examining his work there can be little doubt that Norman McGrath is indeed a technician with an artist's eye.

—J.H.

Jon Holmquist has been a professional photographer for 15 years and is a programmer-analyst with Aster Publishing's computer services department.

***Photographing Buildings Inside and Out*, $32.50 (cloth), $22.50 (paper)**

Mail orders must be prepaid and should include $2 for postage and handling for one book; add 50 cents for each additional book.

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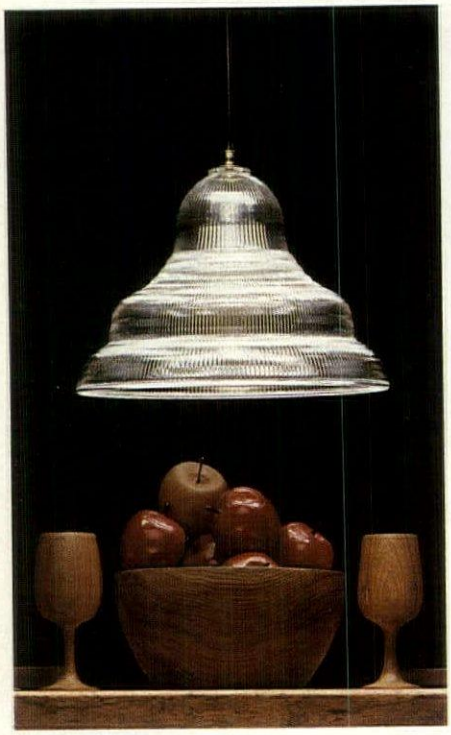
Product Showcase



■ Prismatic glass pendant

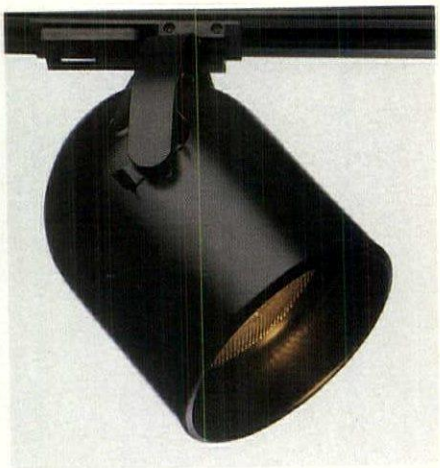
Holophane's Liberty Series luminaires for commercial interiors come in two models: a wall-mounted sconce and the stem-mounted chandelier shown here. The shades are made of prismatic glass, and the fixtures have a lacquered solid brass trim. The manufacturer recommends clear incandescent lamps as the light source. Holophane, Newark, OH.

Circle 60

■ Line-voltage minilight

Trakliting's line-voltage minilight has an adjustable socket that accepts a 50-watt PAR 20, a 55-watt GTE/Sylvania Designer 16, or a 50-watt R20 lamp. The R5T housing is designed for installation in ceilings with 6-inch joist construction. Trims include a pinspot, wall washer, baffle, reflector, and the eyeball shown here. Trakliting, Inc., City of Industry, CA.

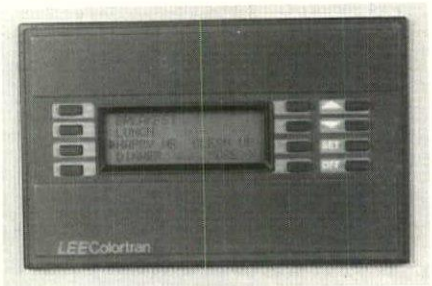
Circle 61



■ PAR 38 accent light

The C153 cylinder from Lighting Services is a compact modular-ended unit designed for spaces requiring nonfiltered incandescent light; it accommodates medium-base PAR 38 lamps, adjusts fully in the horizontal plane, and has vertical yoke rotation stops from 0 to 35 degrees. The fixture has self-locking focus adjustments, a complete range of mounting fittings, and an optional coiled cord; most models also have a built-in switch. Lighting Services Inc., Stony Point, NY.

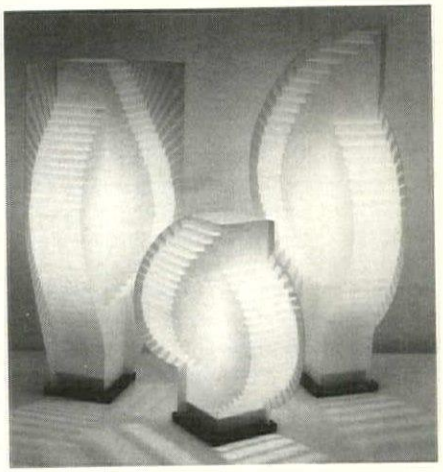
Circle 62



■ Control system

Lee Environmental Lighting's control system uses remote universal dimmers. The master control station can display user-selected channel names, preset names, and lighting levels stored in its electronic memory. The flexible system can be configured for single-station installations and complex applications that use up to 40 stations and 216 dimmers. Lee Colortran, Burbank, CA.

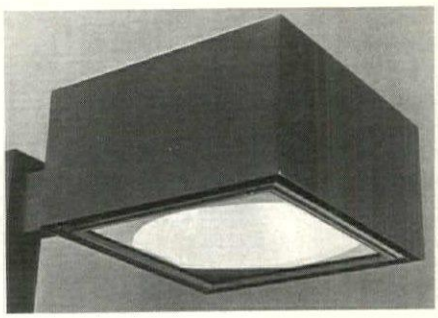
Circle 63



■ Fiber glass shades

Lukasz Bogucki designed Finezze's new line of Lukashades, which are made of translucent, washable fiber glass. The shades come in three models, from 24 to 50 inches in height. Bases are available in black or white lacquered wood, marble, and granite. The luminaires accommodate a 40- or 60-watt candelabra-base lamp. Finezze, Inc., Venice, CA.

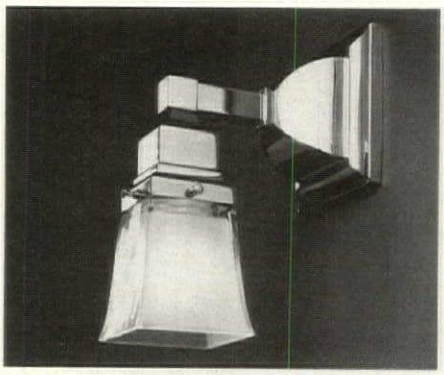
Circle 64



■ Outdoor area lighting

Luxmaster luminaires from American Electric are designed for easy maintenance. Features include a one-piece aluminum housing, an aluminum reflector, a tempered-glass lens, and a field-adjustable socket assembly. A removable electrical assembly allows for easy field installation and servicing; all electrical components mount to a single panel. The fixtures are available for all HID light sources and are easily adapted to fit round or square poles. American Electric, Memphis, TN.

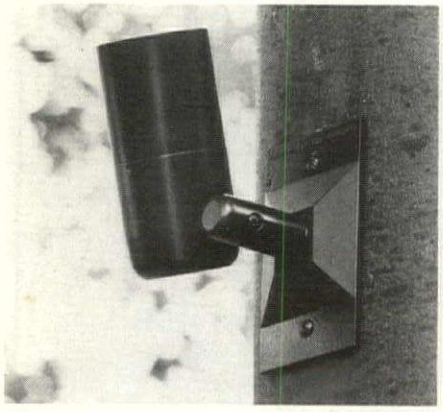
Circle 65



■ **Brass wall sconce**

The Evanston solid brass wall sconce from Brass Light Gallery's Goldenrod Collection features a classic design appropriate for both new and restoration projects. It comes in contemporary white and four metal finishes and can be mounted with the glass shade aimed up or down. Matching double-lamp and chandelier models are available. Brass Light Gallery, Milwaukee, WI.

Circle 66



■ **Landscape lighting**

Lumiere Design & Manufacturing offers the Cambria model 203 landscape lighting fixture. The low-voltage fixture is precision-machined and sealed with an O ring. It accepts an MR16 lamp from 20 to 50 watts and is finished in several colors and plated finishes. The fixture can be used for uplighting plants and textured surfaces, downlighting plants and buildings, and accent-lighting objects or walkways. Lumiere Design & Manufacturing, Inc., Westlake Village, CA.

Circle 67

■ **Commercial HID luminaire**

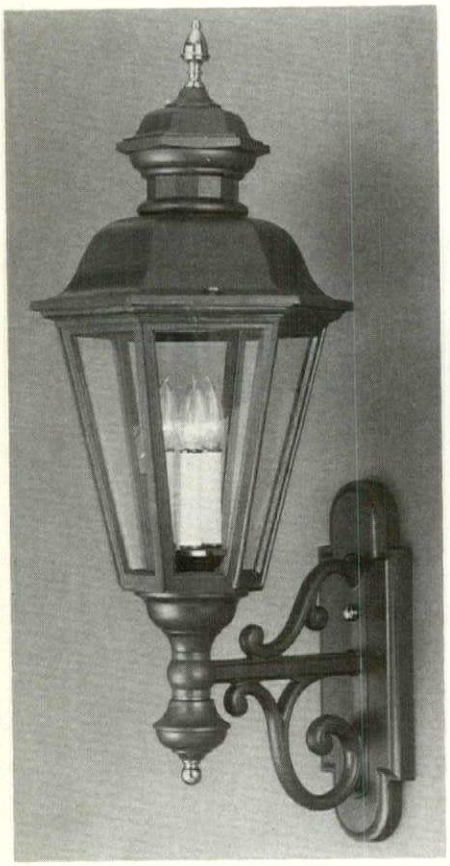
Hanover Lantern's Providence series HID area lighting fixture is made of high-strength corrosion-resistant cast aluminum in a style reminiscent of gaslights. It has a high-impact clear acrylic body, a two-piece vent top, and a top dome of spun aluminum that is hinged for easy relamping. Refractor and reflector light distribution systems are available. Hanover Lantern, Hanover, PA.

Circle 68

■ **Exit sign**

Perfeclite offers a complete line of exit signs for incandescent and fluorescent sources in a variety of housing materials, finishes, and mounting options. Many contemporary styles also accommodate universal symbols. Perfeclite, Cleveland, OH.

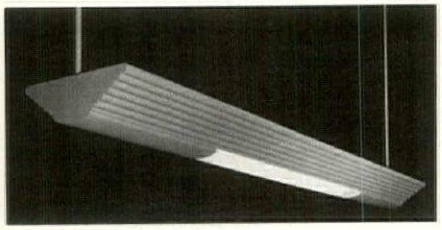
Circle 69



■ Wall-mounted lantern

Hinkley Lighting offers the Manchester outdoor wall bracket made of solid cast aluminum with a polished brass trim. The lantern has panels of unbreakable clear acrylic and comes in six finishes and four sizes. Hinkley Lighting, Cleveland, OH.

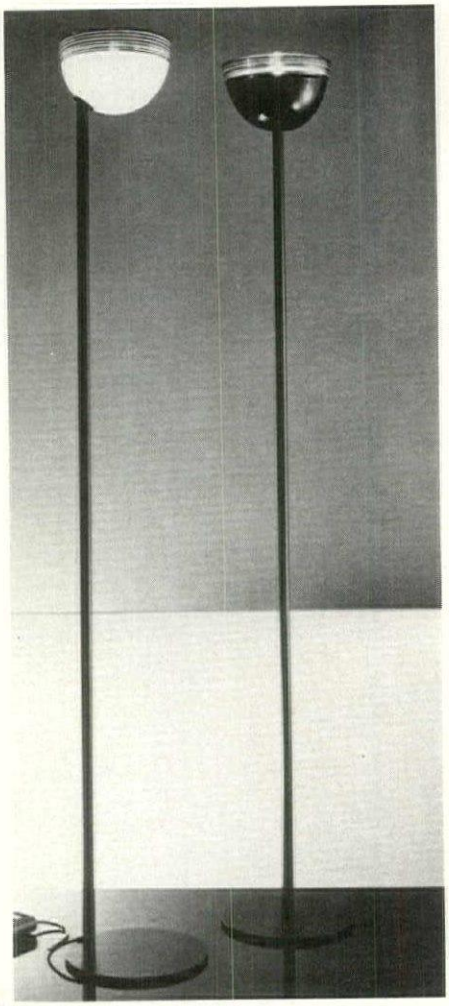
Circle 70



■ Direct, indirect lighting

Architectural Lighting Systems offers a fluorescent luminaire that provides lensed downlighting and ambient uplighting in four styles, three standard lengths, and a variety of sizes and colors. The luminaire can be suspended by cable or stem and can be tandem-mounted in a series. The standard downlight is centered in the luminaire; it can also be constructed eccentrically for continuous runs. Architectural Lighting Systems Inc., Taunton, MA.

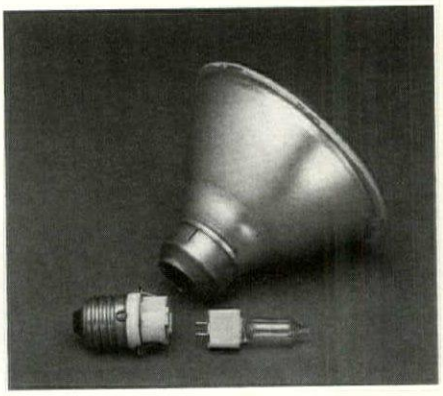
Circle 71



■ Floor lamp

Federico de Majo designed DEC USA's Istrione floor lamp, which features a double-cased, hand-blown Murano glass shade in black or white. The top of the shade is formed of multicolored glass rings. The luminaire has a floor dimmer switch with a night light. Its pole and base are finished in matte black. The floor lamp accommodates one Edison-base Halostar lamp up to 250 watts. DEC USA, Ltd., Mount Vernon, NY.

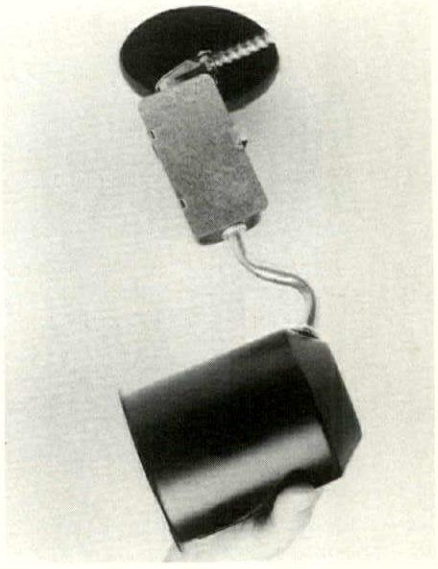
Circle 72



■ Renewable halogen PAR lamp

Lite-Tronics International has introduced the renewable Ultrapar lamp, which consists of a PAR 38 lamp envelope and a replaceable inner halogen lamp. The unit comes in two wattages and three beam patterns. Lite-Tronics International, Alsip, IL.

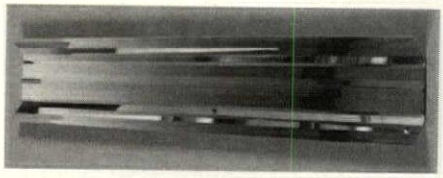
Circle 73



■ Recessed fixture

Capri Lighting's RR4X is among a family of UL-listed fixtures with thermally protected recessed housings for existing ceilings. The unit's miniature housing fits 2-inch by 6-inch joist construction; it can be spaced as close as 8 inches. It comes prewired with knockouts for connecting to new or existing wiring. Fixtures in the line accept a wide variety of trims. Capri Lighting, Los Angeles, CA.

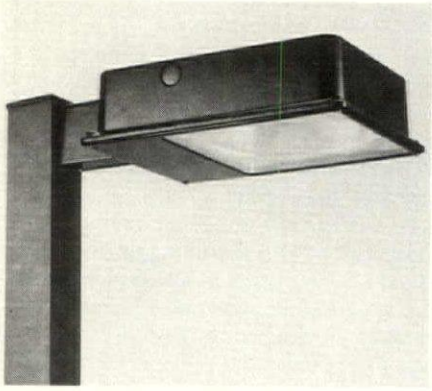
Circle 74



■ Silver film laminate

Deposition Technology offers Specular+, a pure silver film laminated to a metal substrate for use in fluorescent fixtures. Users can reduce the number of fluorescent lamps and ballasts needed, according to the manufacturer, because the film reflects at least 94 percent of incident light. The material is available in coils or sheets and in gauges and widths custom-tailored to meet end users' requirements. Deposition Technology, Inc., San Diego, CA.

Circle 75



■ Area lighting

McGraw-Edison's Concise low-profile HID luminaire comes in a choice of optical systems for lighting perimeters, walkways, and roadways and parking areas. The fixture has a one-piece die-cast aluminum housing, silicone gasketing, a multifaceted one-piece specular aluminum reflector, a clear, flat tempered glass lens, and a choice of HID ballasts. Finishes are thermoset polyester powder coat in bronze, gray, white, and black. An optional clear polycarbonate drop lens is available for all fixtures except the 175-watt metal halide. McGraw-Edison, Vicksburg, MS.

Circle 76

■ Transformer, dimmer

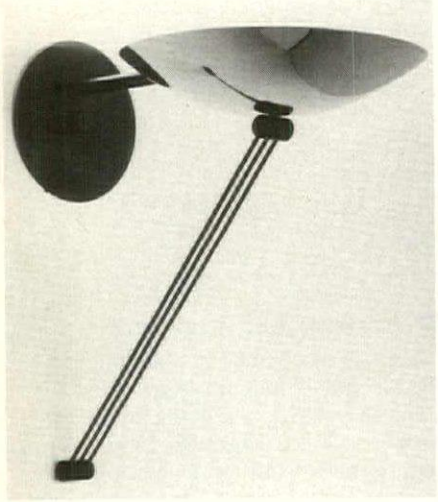
Lazin Lighting is the U.S. distributor for the Relco RS 7 dimmer. The compact solid-state device has an integral transformer so it can transform standard current from 110 volts to 12 volts and dim the low-voltage output. The in-line dimmer is made for floor and table-top applications and can be used with any low-voltage halogen source up to 60 watts. Relco/Lazin Lighting, New York, NY.

Circle 77

■ Traditional outdoor lantern

ELA's Colonial Inn lantern of solid brass, aluminum, and glass has a hinged hood and a glass chimney frosted for three-quarters of its height. It accommodates a medium-base incandescent lamp up to 100 watts and comes in three sizes; the two larger models can be converted to HID. Options include a metal or glass hood and bottom finials. Environmental Lighting for Architecture, Inc., City of Industry, CA.

Circle 78



■ Wall sconce

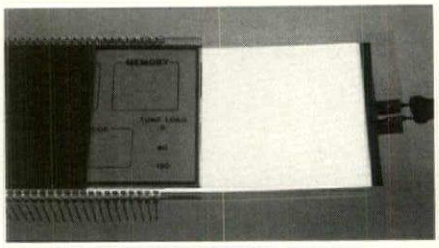
The Arkos wall sconce from Tech Lighting has three linear metal arms supporting a dish-shaped reflector that comes in a choice of finishes. It accommodates a 300- or 500-watt halogen lamp and can be dimmed. Tech Lighting, Chicago, IL.

Circle 79

■ HID indirect lighting

SPI Lighting's Renaissance pendant fixtures provide indirect HID lighting for interior spaces. They come with translucent or metal domes and metal trim rings. The symmetrical optical system has a specular aluminum reflector and a tempered glass lens. Options include multiple stem designs and chain mountings. The fixtures accommodate 100- to 400-watt metal halide or high pressure sodium lamps. SPI Lighting Inc., Mequon, WI.

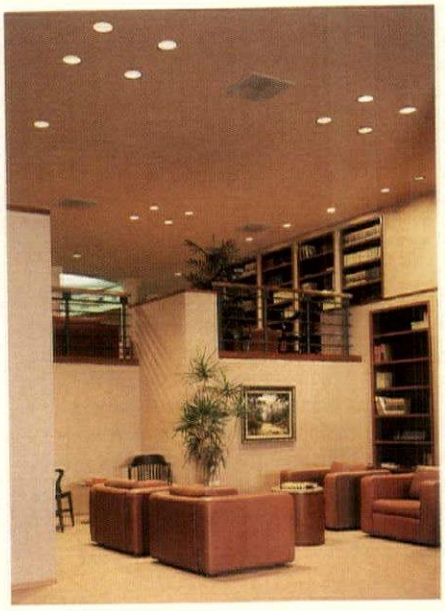
Circle 80



■ Electroluminescent lamp

Bonar Kard-O-Lite's EL lamps are made of a flat, thin, unbreakable electroluminescent material that can be easily die-cut to any configuration. The lamps are suitable for LCD backlighting, membrane switches, flat panel displays, and emergency and safety lighting. Bonar Kard-O-Lite, King of Prussia, PA.

Circle 81



■ Downlight series

Lithonia Lighting offers the Gotham Downlighting line of high-performance, specification-grade luminaires that includes incandescent, fluorescent, HID, and low-voltage models with a variety of aperture sizes, beam spreads, and appearance characteristics. Several reflector systems, optional mounting devices, and sloped ceiling adapters are available, as are lensed, pulldown, and square models. Lithonia Downlighting, division of Lithonia Lighting, Conyers, GA.

Circle 82

■ MR11 lamps

GE Lighting features six MR11 display lighting lamps from its Precise halogen line. The 20- and 35-watt lamps come in narrow spot, spot, and narrow flood beam patterns. They have a 2000-hour average rated life in any burning position

and a 2950K color temperature. The 20-watt lamps produce 260 lumens, the 35-watt lamps 460 lumens. All use the same Multi-Mirror reflectors found in the line's MR16 lamps, operate on 120-volt circuits, and employ a GZ4 two-pin base.

The lamps' small size — 35 millimeters in diameter and 35 millimeters long — makes them suitable for very compact spotlighting applications, such as small track lighting fixtures, display lights on shelving and in display cabinets, and miniature downlights. GE Lighting, Cleveland, OH.

Circle 83

■ Red cedar light pole

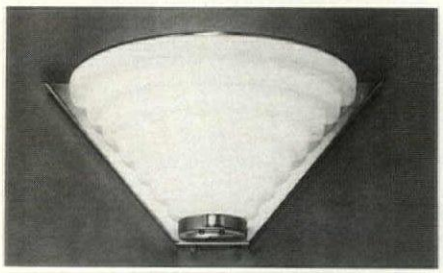
Ryther-Purdy offers solid and laminated Western red cedar street lighting standards in a variety of styles and surface textures. The pole shown has a square shaft with chamfered corners for a tapered look that does not sacrifice material strength. All poles have a concealed wireway and are customized to accept a fixture of the buyer's choice. Ryther-Purdy Lumber Co., Inc., Old Saybrook, CT.

Circle 84

■ Standard floodlight

Ruud Lighting's standard floodlight for 1000-watt metal halide or high pressure sodium lamps features computer-designed symmetrical beam spread optics, a seamless die-cast aluminum housing, and a recessed die-cast aluminum frame that holds the tempered glass lens in place. The ballast, capacitor, and igniter are preinstalled in the housing. The floodlight is available for slip-fit mounting on poles or tenons or yoke-bracket mounting on walls or the side of a pole. Ruud Lighting, Inc., Racine, WI.

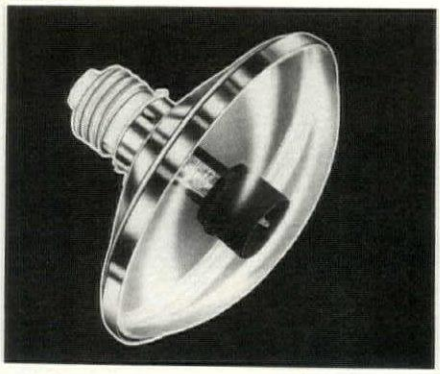
Circle 85



■ Decorative, emergency sconce

Siltron Illumination's Tier Drop wall sconce can double as an emergency fixture. The unit of seven translucent white acrylic rings has a gold-colored trim and is mounted on a polished brass plate that conceals an optional emergency lighting power pack. If used for regular lighting only, the sconce takes an incandescent lamp up to 150 watts. If used for combination regular and emergency lighting, it takes a 13-watt twin-tube compact fluorescent lamp. Siltron Illumination, Inc., Cucamonga, CA.

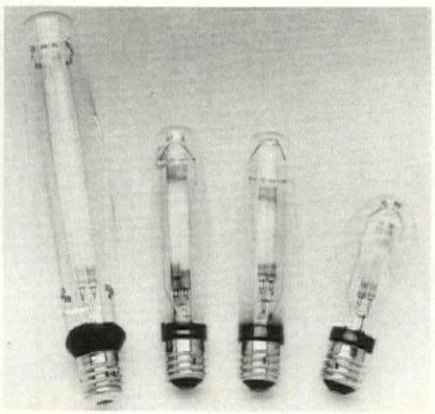
Circle 86



■ Halogen PAR 36 lamp

Leecraft offers the 100-watt High-Lite line-voltage PAR 36 halogen lamp assembly in pinspot and flood beam configurations. It has a replaceable 100-watt bipin halogen lamp, a medium screw base, and a specular reflector. The pinspot has a special shield around the light source that intensifies the beam by preventing stray sidelight. The average lamp life is 1750 hours, and the color temperature is rated at 3100K. Interchangeable color lenses are optional. Leecraft Manufacturing Co., Inc., Long Island City, NY.

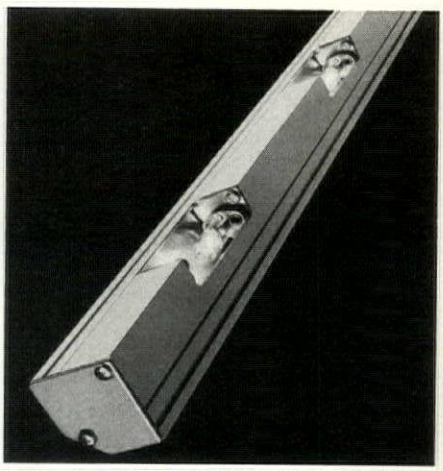
Circle 87



■ HPS lamps with standby arc tube

GTE offers a 150-watt Sylvania Lumalux double arc-tube high pressure sodium lamp for standby lighting. Unlike standard HPS lamps, which usually need a cooldown period of 1 to 1½ minutes before restriking after a momentary power loss, the standby arc tube will strike immediately and provide low-level safety and security illumination until the first arc tube has cooled and restruck. GTE/Sylvania, Danvers, MA.

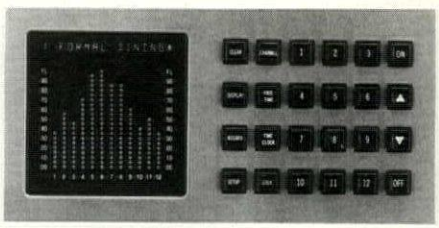
Circle 88



■ Showcase lighting

The Danalite system incorporates high-intensity, low-voltage quartz halogen lamps into a slim profile linear strip light that provides maximum light output in limited space. The model 9100 showcase series has a standard light unit with a continuous extruded reflector; the 9200 model's light unit is mounted inside a stainless steel reflector. A variety of metallic and painted finishes are available. Danalite, Huntington Beach, CA.

Circle 89

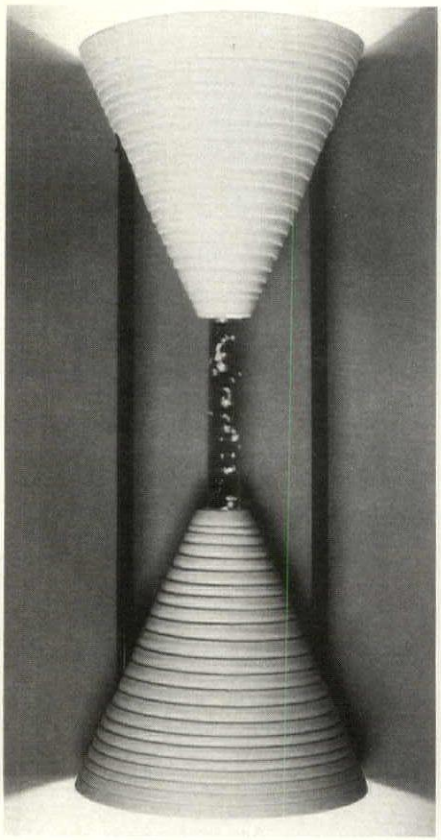


■ Electronic preset control

The EPC-1 computer-based lighting management system from Macro Electronics operates up to 12 control channels and 14 preset lighting intensities. The master control module operates

either alone or with remote control stations. Features include menu operation, time clock control, programmable preset labels, electronic locking, and time fades that can be adjusted from 1 second to 60 minutes. Macro Electronics Corporation, Austin, TX.

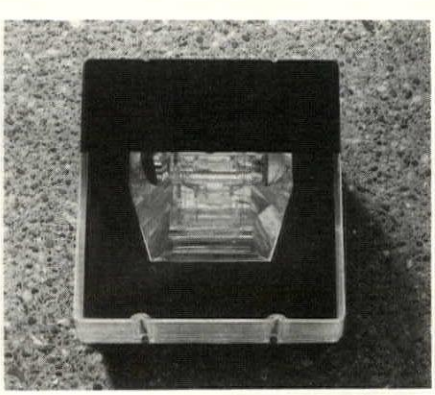
Circle 90



■ Decorative wall fixture

Glazed ceramic wall fixtures in the model 3000 series from Justice Design Group have a bubbler chamber that scatters and diffuses the light shone through it. The scattered light results when gas is discharged into a liquid in the break-resistant, heavy-duty Pyrex chamber. The liquid in the sealed chamber boils when warmed; the chamber never needs refilling. The fixture is 21 inches high, 8½ inches wide, and 6 inches deep; it accommodates two halogen lamps up to 150 watts each. Justice Design Group, Inc., Los Angeles, CA.

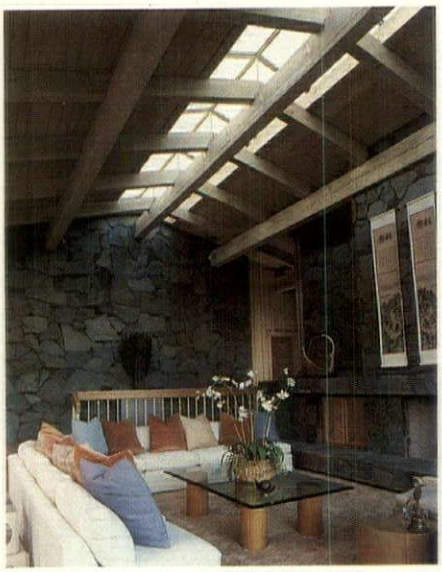
Circle 91



■ Adjustable cutoff luminaire

Emco's Silhouette luminaire can be field-adjusted without tools to throw light at an angle of 60 to 75 degrees from its mounting plane. It features a heavy-duty aluminum housing and an impact- and vandal-resistant polycarbonate lens. The luminaire accepts HID lamps up to 250 watts and comes in five mounting options for lighting walkways or walls and for defining perimeters. Emco Environmental Lighting, Milan, IL.

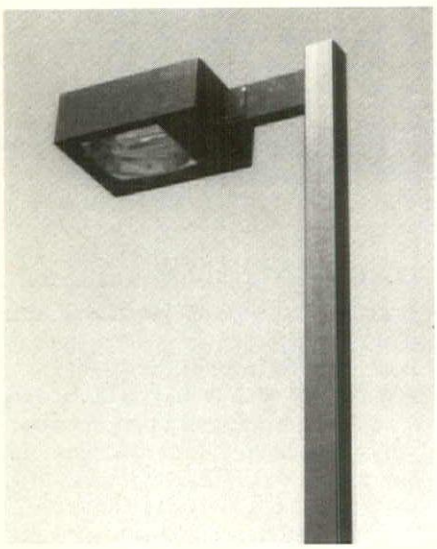
Circle 92



■ Leakproof skylights

Bristolite offers a skylight with a patented fiber glass frame that contains no metal parts. The unit is thermally efficient and guaranteed leakproof. It is designed to eliminate the need for gaskets, seals, and welds and is available in fixed or openable models in standard sizes up to 10 feet across. Bristolite Skylights, Santa Ana, CA.

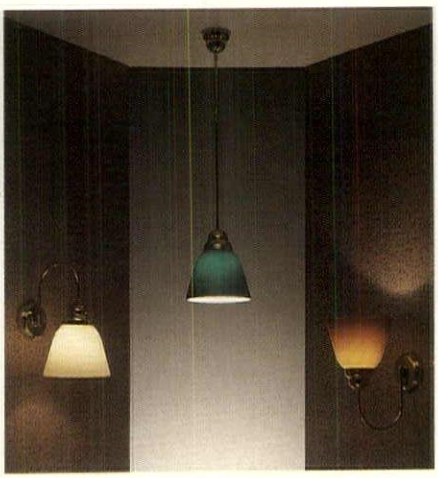
Circle 93



■ Square fiber glass poles

Shakespeare offers straight and tapered square fiber glass light poles in both anchor-base and direct burial models. The anchor-base straight poles have a smooth finish and come in heights from 6 to 16 feet; the anchor-base tapered poles are textured and come in heights from 16 to 25 feet. Direct burial models have similar heights and dimensions. The fiber glass poles weigh less than other types, are permanently color impregnated during manufacture, and arrive ready to install. Shakespeare, Newberry, SC.

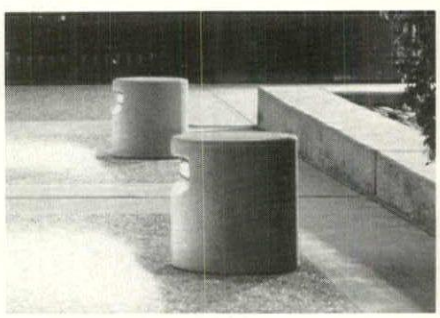
Circle 94



■ Cased bell shade fixtures

Boyd Lighting's collection of residential and contract lighting fixtures includes these brackets and pendants with bell-shaped cased glass shades. The mouth-blown shades come in acid-etched champagne and four nonetched colors; the metal parts come in three finishes. The bracket model also has a push-button switch on its backplate. Boyd Lighting Company, San Francisco, CA.

Circle 95



■ Illuminated bollards, seats

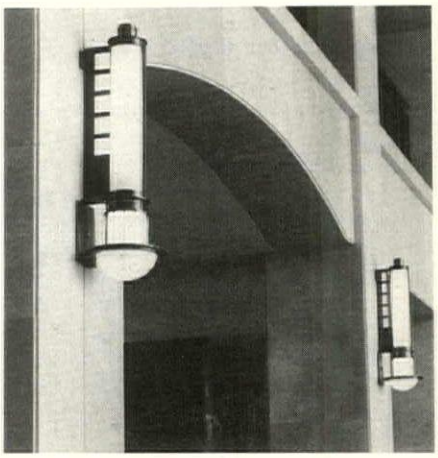
Reinforced concrete Bollard/Seats from Bega/FS and Forms+Surfaces function as both site furniture and low-level light sources. Their recessed lighting units accommodate one 9-watt twin-tube compact fluorescent lamp and come with white safety glass diffusers or die-cast aluminum louvers. The bollards come in five colors and five geometric designs, including one that can double as bench ends. Bega/FS, Santa Barbara, CA.

Circle 96

■ Wall-mounted luminaire

TrimbleHouse's model 9150 wall-mounted fixture is designed for restorations, renovations, and traditional accent lighting. The heavy cast-aluminum version shown is mounted on the wall of an authentic copy of a building in Colonial Williamsburg. It has a three-branch incandescent candelabra as a light source. An HID version and other versions, including corner wall brackets, are available. TrimbleHouse, Norcross, GA.

Circle 97

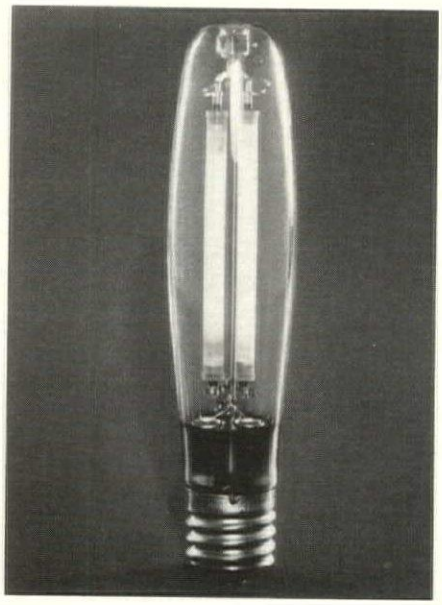


■ Custom wall luminaire

Livers Bronze designs and manufactures custom lighting fixtures and other metal

products. Pictured is a custom outdoor luminaire designed for a building in Atlanta. It is made of bronze with a medium oxidized finish and has white opal acrylic diffusers. The fixture accommodates two 20-watt T12 fluorescent lamps and one Philips SL* compact fluorescent lamp at the bottom. Livers Bronze Co. Inc., Kansas City, MO.

Circle 98



■ Double arc-tube HPS lamp

Ceramalux double arc-tube high pressure sodium lamps from North American Philips relight instantly after a momentary power interruption. The 250- and 400-watt lamps have two arc tubes mounted in parallel; only one is lighted at any given time. The second arc tube lights instantly when power returns. It immediately provides 3 to 5 percent of full output and reaches normal output within two minutes. The lamps are suitable where low light levels after power interruptions can cause safety hazards, such as in power plants, steel mills, airports, and correctional facilities. North American Philips Lighting Corporation, Somerset, NJ. ■

Circle 99

Product Literature

■ Lighting controllers

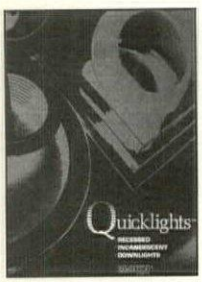
A 24-page condensed catalog profiles Lutron's lighting controls. Included are illustrations and specifications for wall box dimmers and a variety of larger dimming systems, lighting controllers, and accessories. Lutron Electronics Co., Inc., Coopersburg, PA.

Circle 120

■ Fiber optic lighting

A color brochure describes and illustrates the Fiberstars fiber optic lighting system, which is designed to light the outlines of architectural shapes. Fiberstars, Fremont, CA.

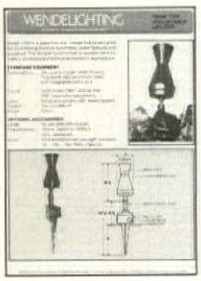
Circle 121



■ Recessed downlights

A brochure from Omega Lighting illustrates fixtures and accessories in the Quicklights collection of recessed incandescent downlights. Both low- and line-voltage models are included. Omega Lighting, Emerson Electric Co., Melville, NY.

Circle 122



■ Adjustable uplight

A data sheet from Wendelighting's product catalog describes features of the model 1350 adjustable Upliter, a glare-free low-voltage fixture for illuminating medium-size trees, water features, and sculpture. Wendelighting, Burbank, CA.

Circle 123

■ Pole bases

Spring City offers pole bases to combine with conduit or pressure pipe for low-cost lighting standards. A two-color bulletin describes features of the bases. Spring City Electrical Manufacturing Company, Spring City, PA.

Circle 124

■ Coated lamps

A brochure from Shat-R-Shield describes its plastic-coated lighting and specialty products line, including fluorescent, incandescent, heat, and high-output lamps and coated glass containers and enclosures. Shat-R-Shield, Shrewsbury, NJ.

Circle 125

■ Metal halide wall washer

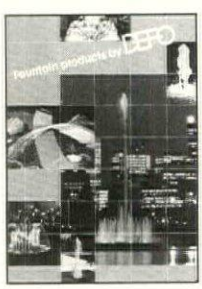
A data sheet from Miroflector details features and photometrics of a recessed wall washer from its Miro-T line that is designed to accept tubular metal halide lamps. A cutaway drawing is included. Miroflector, Inwood, NY.

Circle 126

■ Area lighting

Hadco offers the Yard-Lite in wall- and post-mounted versions for walkway and area lighting applications. A data sheet lists specifications and contains cutaway drawings of both versions. Hadco, Littlestown, PA.

Circle 127



■ Fountain products

An illustrated color brochure features Defo fountain components, including underwater lights and electrical equipment. Decorative Fountain Co., Scarborough, Ontario, Canada.

Circle 128

■ Decorative luminaires

A 113-page color catalog from Kichler Lighting contains photos of chandeliers, wall sconces, ceiling- and wall-mounted lamps, bar strips, and other indoor and outdoor luminaires for commercial and residential applications. Kichler Lighting, Cleveland, OH.

Circle 129

■ Fluorescent tube lights

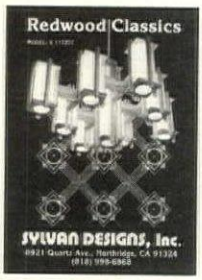
A brochure about the Hallmark line of direct and indirect fluorescent tube lights covers system components and dimensions and shows samples of 14 color choices. Standard Electric Fixture Co., Inc., Miami, FL.

Circle 130

■ Incandescent reflector

A data sheet describes features of the Half-Watt Reflector, which allows users to replace R and PAR lamps in track and downlight fixtures with A19 incandescent or the new A19-type halogen lamps. Energy Saving Products, Inc., Huntington Beach, CA.

Circle 131



■ Redwood chandeliers

A brochure from Sylvan Designs presents the Redwood Classics line of chandeliers, pendants, and several custom fixtures made of clear, kiln-dried natural redwood heartwood. Sylvan Designs, Inc., Northridge, CA.

Circle 132

■ Indoor brass fixtures

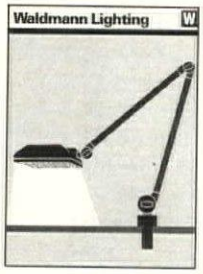
A 20-page color catalog presents Victorian-style solid brass chandeliers, wall brackets, table lamps, and floor lamps, many with colored glass shades. The company also specializes in customized pendants and chandeliers. Brass Reproductions, Chatsworth, CA.

Circle 133

■ Reactance ballast

The energy-efficient Cool-Temp reactance ballast from Energy Technologies operates standard F40 lamps at full light output with 30 percent less energy. A data sheet explains features and lists specifications. Energy Technologies Corp., San Diego, CA.

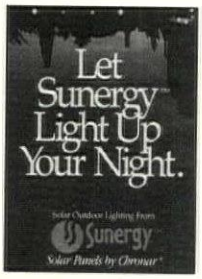
Circle 134



■ Office task light

A brochure illustrates Waldmann Lighting's 209 Designer Series office task light, which features a built-in parabolic louver, an articulated arm, a swivel head, and two 9-watt compact fluorescent lamps. Waldmann Lighting Company, Wheeling, IL.

Circle 135



■ Solar outdoor lighting

Sunergy offers a line of solar-powered outdoor accent and pathway lights with photovoltaic panels that collect energy and store it in built-in batteries. Each fixture is pictured and described. Sunergy, Inc., Princeton, NJ.

Circle 136

■ Indoor lighting software

Elite Software's Light can read and convert IES candela curve data and uses the zonal cavity method to calculate fixture requirements, energy use, a fixture schedule report, and a complete bill of materials and costs. Elite Software Development, Bryan, TX.

Circle 137

■ Photometric instruments

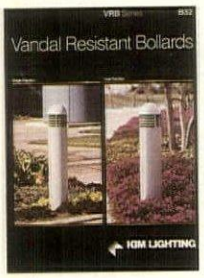
LMT Lichtmesstechnik's line of light measurement instruments includes illuminance meters, luminance meters, colorimeters, and goniophotometers. A brochure details features and uses for each model. LMT, San Diego, CA.

Circle 138

■ Fluorescent luminaire

The Neptune from Wattohm Eclairage is a sealed luminaire for compact fluorescent lamps specially designed for damp, dusty areas. A data sheet contains features and photometric data. Distributor: Jean Richard International Ltd., Westmount, Quebec, Canada.

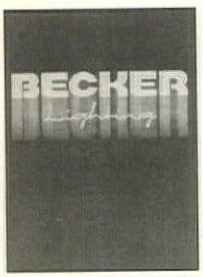
Circle 139



■ Vandal-resistant bollards

A color brochure describes the VRB series of single- and dual-function vandal-resistant bollards. The dual-function model provides cutoff lighting for pathways and uplighting for adjacent landscape. Kim Lighting, City of Industry, CA.

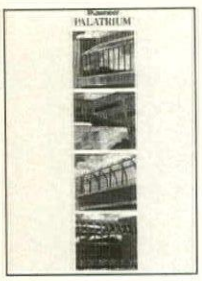
Circle 140



■ Indoor lighting

A 56-page color catalog presents Becker Lighting's collection of decorative pendants, ceiling-mounted luminaires, wall sconces and brackets, and light bars. Dimensions and lamp requirements are included. Becker Lighting, City of Industry, CA.

Circle 141



■ Overhead glazing

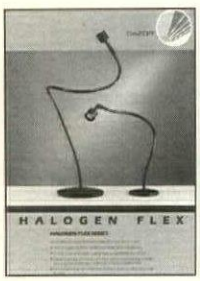
Kawneer features the Palatrium Series of three commercial-quality slope glazing systems that use skylights, curved slopes, and barrel vaults. Kawneer Company, Inc., Norcross, GA.

Circle 142

■ Polycarbonate fixtures

A 12-page brochure from Carlon/Thyrocon features the Brite-Gard line of impact-resistant polycarbonate lighting products and accessories for HID, incandescent, and fluorescent sources. Carlon/Thyrocon, Cleveland, OH.

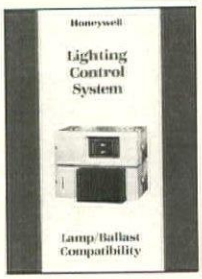
Circle 143



■ Halogen task lamp

Dazor Manufacturing offers the Halogen Flex series of table, floor, and clamp-on lamps, which have a flexible arm and an adjustable head. A data sheet shows models and lists features. Dazor Manufacturing Corp., St. Louis, MO.

Circle 144



■ Lamp, ballast chart

Honeywell offers a lamp and ballast compatibility chart for its EL7000 fluorescent lighting control system; it lists about 60 combinations of nonstandard lamps and ballasts that can be used with the system. Honeywell Inc., Golden Valley, MN.

Circle 145

■ Landscape fixture

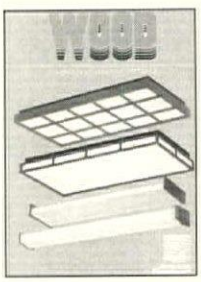
A data sheet details Electro-Elf's Pagoda Style landscape lighting fixture, which takes a compact twin-tube fluorescent lamp and comes in a choice of lens and body colors. Electro-Elf, Temple City, CA.

Circle 146

■ Modular lighting control

Energy Technology's System 2000 stand-alone modular lighting control unit reduces power usage on fluorescent and HID lamp circuits. A brochure contains cutaway drawings and lists features and specifications. Energy Technology, Inc., Hoffman Estates, IL.

Circle 147



■ Fluorescent luminaires

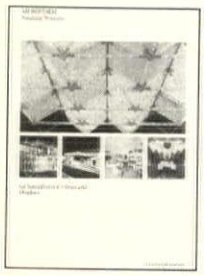
A brochure from American Fluorescent features a line of luminaires with solid oak frames or ends. Illustrations and ordering information for 10 models are included. American Fluorescent Corporation, Waukegan, IL.

Circle 148

■ Outdoor fixtures

A brochure from Sterner Lighting details Infranor floodlights for illuminating building facades, parking lots, arenas, and other outdoor facilities. Components, accessories, and options are included. Sterner Lighting Systems Incorporated, Winsted, MN.

Circle 149



■ Space frames

The Meroform modular system of connecting nodes and tubes can be used for visual merchandising and other interior applications. Accessories include a lighting system with fluorescent tubes and accent fixtures. Mero Corporation, Hawthorne, NY.

Circle 150

■ Accent lighting

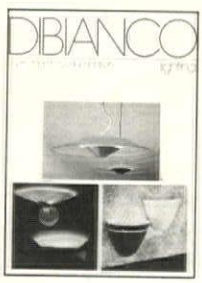
The Telstar Gemini series from Jensen Electric is a low-voltage lighting system that can easily be installed and expanded. A data sheet describes the system and lists colors, lengths, lamp spacings, and finishes. Jensen Electric Company, Reno, NV.

Circle 151

■ Lantern collection

A 23-page color catalog supplement from Georgian Art presents a line of decorative post-top and wall-mounted lanterns of solid brass or cast aluminum in several finishes and styles. Georgian Art Lighting Designs, Inc., Lawrenceville, GA.

Circle 152



■ Contemporary luminaires

A color brochure from DiBianco Lighting features 23 luminaires from its contemporary Murano glass collection of wall sconces, pendant lamps, floor lamps, and table lamps. DiBianco Lighting, Brooklyn, NY. ■

Circle 153

Calendar

July 25, 1988	**Calendar deadline** for September *Architectural Lighting.* Contact: Susan Degen, Assistant Editor, *Architectural Lighting,* P.O. Box 10460, Eugene, OR 97440, (503) 343-1200.
July 25–27, 1988	**Basics of lighting institute,** Boulder, CO. Three-day course on fundamentals of light and lighting design. Contact: Independent Testing Laboratories, 3386 Longhorn Road, Boulder, CO 80302, (303) 442-1255.
August 3–6, 1988	**ASID conference,** Sheraton Washington Hotel, Washington, DC. Contact: American Society of Interior Designers, 1430 Broadway, New York, NY 10018, (212) 944-9220.
August 7–11, 1988	**IES annual conference,** Marriott City Center, Minneapolis, MN. Contact: The Illuminating Engineering Society of North America, 345 East 47th Street, New York, NY 10017, (212) 705-7269.
August 24–27, 1988	**World Design '88/New York,** IDSA international conference, Marquis Hotel, New York City. Contact: Industrial Designers Society of America, Great Falls, VA 22066, (703) 759-0100.
August 30–31, 1988	**Workspace '88,** exhibition and conference on the work environment, Moscone Center, San Francisco. Contact: (415) 776-2111.
September 14–15, 1988	**Conpac 88,** Contract Design Center and Concourse Exhibition Center, San Francisco. Show and conference on office, hospitality, health care, and institutional furnishings. Sponsor: Institute of Business Designers, Northern California Chapter. Contact: Craig Winter, Executive Director, Conpac 88, 2 Henry Adams Street, San Francisco, CA 94103, (415) 864-1500 or (800) 542-1415.
September 14–19, 1988	**Euroluce 13,** Milan, Italy. Held in conjunction with the Milan Furniture Fair.
September 15–16, 1988	**Innovations '88,** Houston. Contact: INNOVA, 20 Greenway Plaza, Houston, TX 77046, (800) 231-0617 or (713) 963-9955.
September 25–27, 1988	**Pan Pacific Lighting Expo,** Moscone Center, San Francisco. Contact: Zinkhon Communications, 2 Henry Adams Street, San Francisco, CA 94103, (415) 621-7345.
October 5–8, 1988	**Design New York.** Contact: The Resources Council, (212) 752-9040.
October 6–December 11, 1988	**Neon design and techniques,** Museum of Neon Art, Los Angeles. Eight-week course includes history of neon and creating a work in neon. Contact: Museum of Neon Art, 704 Traction Drive, Los Angeles, CA 90013, (213) 617-1580.
October 23–26, 1988	**IFMA '88,** national conference and exhibition, Atlanta Market Center and Westin Peachtree Plaza, Atlanta. Contact: International Facility Management Association, 11 Greenway Plaza, Houston, TX 77046, (713) 623-IFMA.
October 24–27, 1988	**Indoor lighting institute,** Boulder, CO. Four-day course covers design considerations and analytical techniques for indoor lighting. Contact: Independent Testing Laboratories, 3386 Longhorn Road, Boulder, CO 80302, (303) 442-1255.
November 3–4, 1988	**Lighting management,** Boston. Two-day course on basics of energy-efficient design and retrofit. Repeats December 8–9 in Orlando, FL. Contact: Association of Energy Engineers, 4025 Pleasantdale Road, Suite 420, Atlanta, GA 30340, (404) 447-5083.
November 3–5, 1988	**IIDEX,** interior design conference, Metro Toronto Conference Center, Toronto, Canada. Contact: Association of Registered Interior Designers of Ontario, 168 Bedford Road, Toronto M5R 2K9, (416) 921-2127.
November 7–9, 1988	**China–North America Daylighting Conference,** Scientific Hall, Beijing, People's Republic of China. Cosponsors: IESNA, China IES, and Architectural Physics Academic Committee of the Architectural Society of China. Contact: IESNA, 345 East 47th Street, New York, NY 10017, (212) 705-7915. ■

Classified Directory

ACCENT AND DISPLAY LIGHTING (INTERIOR)

MIROFLECTOR CO., 40 Bayview Ave., Inwood, Long Island, NY 11696 ..... ***516/371-1111***
Full line of recessed accent lights, down lights & wall washers. Architectural cylinders for HQI, incandescent compact quad fluorescents and HID lamp sources.

NL CORP., 14901 Broadway, Cleveland, OH 44137 ..... ***FAX 216/662-9069 or 216/662-2080***
Recessed HID and incandescent; decorative; custom; church; 20, 30, & 60 amp track; fluorescent lighting systems. Call for more information.

ACCESSORIES AND COMPONENTS

AMERICAN LOUVER CO., Skokie, IL, Louvers and Lenses ..... ***800/323-4250 or 312/470-3300***

AMBIENT LIGHTING SYSTEMS (INTERIOR)

AREA LIGHTING (EXTERIOR)

AMERICAN ELECTRIC, 1555 Lynnfield Rd., Memphis, TN 38119 ..... ***901/682-7766***
HID luminaires for area, facade, roadway, sports, and industrial lighting applications.

ELA CO., 17891 Arenth Ave., City of Industry, CA 91748 ..... ***818/965-0821 FAX 818/965-9494***
Mfgs. of decorative outdoor fixtures, poles and arms for the commercial and residential mkts. Custom designing and mfg. of decorative interior/exterior fixtures.

J.H. BAXTER & COMPANY, P.O. Box 10797, Eugene, Oregon 97440 ..... ***503/689-3020***
Manufacturer of Timberwood Lighting Standards. A superior pressure-treated Douglas fir laminate for decorative outdoor lighting support. Contact Richard Baxter.

PEMCO CORP., Philadelphia, PA, Exterior HID & Custom Lighting & Poles ***215/236-9020***

STONCO, 2345 Vauxhall Rd., Union, NJ 07083. Contact Phil Henry at ***201/964-7000***
Outdoor lighting; fixtures and accessories for industrial, commercial and residential markets.

UNION METAL CORP., 1022 9th St. SW, Canton, OH 44707 ..... ***216/456-7653***
Steel, aluminum and concrete poles for area, roadway and sports lighting. Hi-mast raise-lower systems. Ornamental nostalgia lighting poles and luminaires.

CONTROLS

LEE COLORTRAN, 1015 Chestnut St., Burbank, CA 91506 ..... ***FAX 818/954-8520 or 818/843-1200***
VIEWPOINT, a field-configurable system of off-the-shelf Architectural Dimming and Control Components from Lee Environmental Lighting—a division of Lee Colortran, Inc.

DAYLIGHTING PRODUCTS

DECORATIVE LUMINAIRES (INTERIOR)

LAMPS

VENTURE LIGHTING INTL., 625 Golden Oak Pkwy., Cleveland, OH 44146 ..... ***800/437-0111***
Metal Halide, High and Low Pressure Sodium, Mercury, MR-16 and MR-11 Display Lamps. Many new and unique products not available from other manufacturers.

LANDSCAPE LIGHTING

ABEC LIGHTING, 4084 Arnold Ave., #8, Naples, FL 33942 ..... ***813/643-4242 or 813/643-3305***
Quality outdoor landscape & security lighting. PVC construction. Fluorescent/low voltage available—all styles. Custom color & design. Commercial, residential, marine.

IDAHO WOOD, Sandpoint, ID, Landscape Lighting (Wood) ..... ***800/635-1100 or 208/263-9521***

WESTERN LIGHTING INDUSTRIES, 354 W. Valhalla Dr., Burbank, CA 91505 ..... ***818/841-7896***
OMEGALUX 1200, a series of specification grade floodlights utilizing high-intensity fluorescent PL/Dulux lamps. Sizes 7, 9, 13, & 26 watt. All wet location approved.

LIGHTING DESIGN SOFTWARE & TESTING/MEASURING INSTRUMENTS

INTERNATIONAL LIGHT, Dexter Industrial Green, Newburypost, MA 01950 ..... ***617/465-5923***
Radiometers, photometers, spectroradiometers, laser power meters for radiometry, photometry, UV curing, UVA/B phototherapy, germicidal radiometry & UV hazard use.

LIGHTING DESIGNERS AND CONSULTANTS

FREDRICK RAYMOND INC., 16121 S. Carmenita Rd, Cerritos, CA 90701 ..... ***213/926-1361***

OEM MANUFACTURERS

GAYNOR CO., 200 Charles St., Stratford, CT 06497 ..... ***203/378-5545 or FAX 203/381-9019***
For more information about fluorescent wiring devices, switches and lamp holders, call and ask for Jill Sapak.

OTHER LIGHTING SYSTEMS AND LUMINAIRES

PARADISE DESIGN & MFG. INTL., 2633 E. 28th, #602, Signal Hill, CA 90806 ..... ***213/427-5756***
Portable neon fixtures, custom cove lighting & neon art, stock figures for residential, commercial, & architectural applications. For information call Don Narbone.

OTHER SERVICES

REPS WANTED/REPS AVAILABLE

THEATRICAL/STAGE LIGHTING

The Classified Directory is a monthly feature of ***Architectural Lighting,*** offering readers easy access to lighting products and services for commercial, industrial, and institutional applications. Listings in this reference section are sold on an annual basis at the rates outlined below. For full information and closing dates, contact Gordon Exe, (800) 822-6678 or (503) 343-1200.

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In This Issue

Manufacturers

Page 18. *Incandescent light strips come out* (Venetia Town Residence, Miami, Florida).
Ribbonlite: Low-voltage light strips.

Page 20. *Curtain up! Theater lighting for showroom* (Steelcase, Grand Rapids, Michigan).
Electronic Theater Controls: Control system.
GE Lighting: Incandescent lamps.
Halo Lighting: 4-circuit track.
LTM Corporation of America: Fresnel track fixture.
Theatronics: Dimmers.

Page 22. *Iguana chandelier prowls Manhattan bar* (Cafe Iguana, New York City).
Altman: Theatrical fixtures.
Lightolier: Control system.
Neon Designs: Neon.
Nessen Lamps: Tapestry wall sconce.
Nightscaping: Upper bar and veranda starlight fixtures.
Rambusch Lighting: Ceiling washers.
Robert Singer & Associates: Custom chandelier.
Stage Bright Lighting: Custom chandelier frame.
Times Square Lighting: Ceiling washers.
Weiss & Biheler: Crystal.

Page 24. *'80s health spa captures glamour of '30s Hollywood* (Holiday Spa Health Club, Hollywood, California).
Alcan: Fluorescent metal ceiling fixtures.
C.W. Cole & Co.: Incandescent sauna and steam room light.
Columbia Lighting: Fluorescent indirect uplights.
Dual-Lite: Emergency floodlights.
GE Lighting: 400-watt outdoor metal halide area floodlights.
Halo Lighting: Light track and 150-watt spotlights.
Indalux: Twin 400-watt metal halide lamps.
Lithonia Lighting: 400-watt metal halide surface-mounted downlights.
Moldcast: 175-watt metal halide wall mount.
Prescolite: Recessed 9-watt compact fluorescent downlights.
Prudential Lighting: U-tube fluorescent lamps.
Strand Lighting: Theatrical dimming system.
Sylvan Designs: Low-voltage string lights.
GTE/Sylvania: 40-watt fluorescent lamps.
Triarch: Mirror vanity incandescent light strips.

Page 31. *Theatrical approach brings drama to lighted murals* (City Kids and Chang's Mongolian Grill, Portland, OR).
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Rosco: Theatrical color media.

Page 33. *Storefront sources of cold cathode, neon help transform concourse* (National Airport south concourse, Washington, D.C.).
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Neon Projects: Neon and cold cathode lighting.
Pittsburgh Corning: Glass block.

Manufacturer credits reflect the products specified for the projects; it is possible that other products were installed during construction or maintenance.

Photographers

William Britton Photography, 2580 Pioneer Pike, Eugene, OR 97401, (503) 342-2034

Jay Good, Jay Good Photography, 20901 NE 26th Avenue, North Miami Beach, FL 33180, (305) 935-4884

Rik Hamilton Photography, P.O. Box 2240, Southport 4215, Gold Coast, Queensland, Australia

John Letourneau, P.O. Box 1088, New York, NY 10185, (212) 228-5293

Richard Loveless, J.R. Loveless Design, 3617 West MacArthur Boulevard, Suite 511, Santa Ana, CA 92704, (714) 754-0886

David McShane, 1416 SE 49th, Portland, OR 97215, (503) 231-1599

John Troha, 12258 St. James Road, Potomac, MD 20854, (301) 340-7220

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