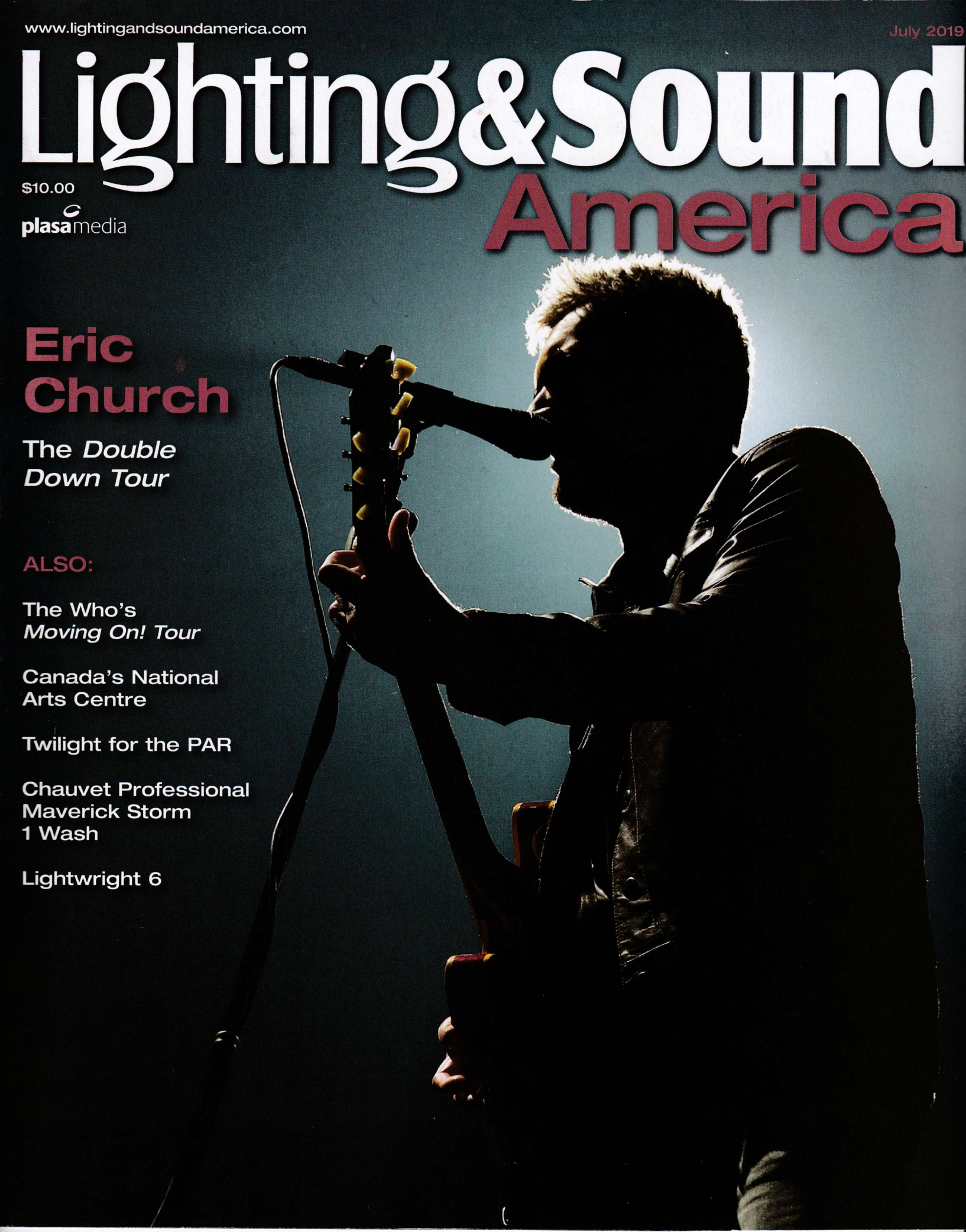
www.lightingandsoundamerica.com

July 2019

Lighting&Sound America

$10.00

plasamedia



Eric Church

The *Double Down Tour*

ALSO:

The Who's *Moving On! Tour*

Canada's National Arts Centre

Twilight for the PAR

Chauvet Professional Maverick Storm 1 Wash

Lightwright 6

Twilight for the PAR

By: Michael Callahan

A look back at its many contributions

This month brings the news that Altman Stage Lighting is discontinuing its traditional PAR fixtures, after almost a half-century in production, because lamp manufacturers are thinning out their PAR bulb lines.

This seems a good time for a look back at tools so useful that the same lamps and fixture designs could serve us unchanged for five decades.

We remember the PAR for its dominant role in concert lighting in the 1970s and '80s; as an important player in location film and television; and, in smaller sizes, in border strips, display, and architectural lighting.

By making concert tour lighting practical, the PAR64 also encouraged efforts to make it more efficient, which gave us the modern infrastructure of truss, chain motors, multicable, and high-density portable dimming that newer fixtures and other forms of entertainment lighting would later use.

And it was an effort to make the PAR can itself more efficient that gave us the color scrollers still used on Broadway today and that led to the first American moving lights.

Nineteen seventy-two was a big year for concert lighting. In America, it included the arrival of a new PAR 64 fixture on two of rock's biggest tours.

But the PAR lamp itself had already had many jobs in entertainment lighting, and its roots led back to the 1930s and to the first "sealed beam" automobile headlights.

Driving then at night was dangerous, because of poor roads, poor lighting, and problems with headlights.

Headlights were, actually, fixtures: assemblies of a separate bulb, socket, reflector, and lens or cover. After leaving the factory, their performance would decline with the effects of shock, vibration, repairs, and relamping, as well as the buildup of dirt and grime on their many internal surfaces.

Fabricating a single, integrated unit of a filament encased in a glass envelope that was also both reflector and lens radically simplified installation and "sealed out" contami-nants. Molded of thick glass, rather than blown thin, it was rugged and could be accurately shaped, both optically and to assure that when headlights were replaced, they would align properly.

So, in 1939, the US government mandated the use of standardized "sealed beam" headlamps. Specialty lamps were produced for other applications having similar condi-tions, including railroads, marine, and aviation. We would adopt some for "pinspots" (using a 12V bulb originally intended for automotive and marine spotlights) and for ray lights, 28V aircraft landing lights.

A 120V, Edison screw-base PAR 38, introduced in 1942, found architectural, home, and display applications. A thin wall "R" lamp was less expensive (if less efficient). Both would become staples in border strips and inexpensive fixtures for a variety of uses. In the 1970s, General Electric even sold PAR 38s with integral interference film filters for vibrant colors.

In the 1950s, 120V PAR lamps also began appearing in progressively larger sizes and wattages. The 1953 GE catalog offered a 300W PAR 56; in 1956, a 500W PAR 64 was added.

Fresnel vs. PAR

The "wash light" of choice across entertainment lighting had long been the Fresnel. It offered variable beam size, some beam shaping (with barn doors), and soft beam edges that blended well, one fixture with another.

The PAR had none of them, but had its own virtues, one being efficiency.

In a traditional Fresnel, most of the light produced by the lamp was lost inside the housing, because only those rays reaching the lens directly, or via a small reflector, got into the beam. Only 30% efficient at flood, spotting a Fresnel moved the lamp and reflector away from the lens and could cost another 20%.

"Stage and studio" incandescent lamps of the period were also quite large, having large filament structures inside envelopes of relatively low-temperature glass spaced well away. They were big bulbs that made for large fixtures.

Optically, a PAR got much more of total filament output into its beam than did a Fresnel, and from a smaller, lighter, and simpler fixture.

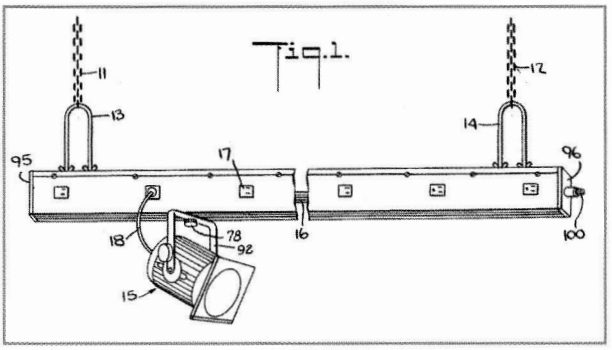
Halogen cycle bulbs began appearing in 1966. They needed high internal temperatures for the chemistry to work, produced by using a small envelope, which, in turn, required high-temperature materials (initially including quartz). These smaller "quartz-halogen" bulbs would allow smaller fixtures to be designed around them.

Halogen lamps could also be squeezed into existing PAR bottles, producing the 1,000W PAR 64. Initially, a 240V version wasn't practical, so 120V lamps were used overseas, on series twofers. (This was true even after 240V lamps appeared, because the smaller 120V filaments made for a better-looking beam.)

That larger PARs might have some value in performance lighting was understood.

Abe Feder introduced a PAR56 strip light on *My Fair Lady* in 1956. Later, he would specify a PAR border strip with individually focusable lamps for the Kennedy Center in Washington, DC.

Mid-century lighting innovator Ariel Davis filed a patent in 1960 illustrating not only a recognizable PAR can, but one hung from an extruded aluminum raceway having an integral Unistrut track. (See image below.)



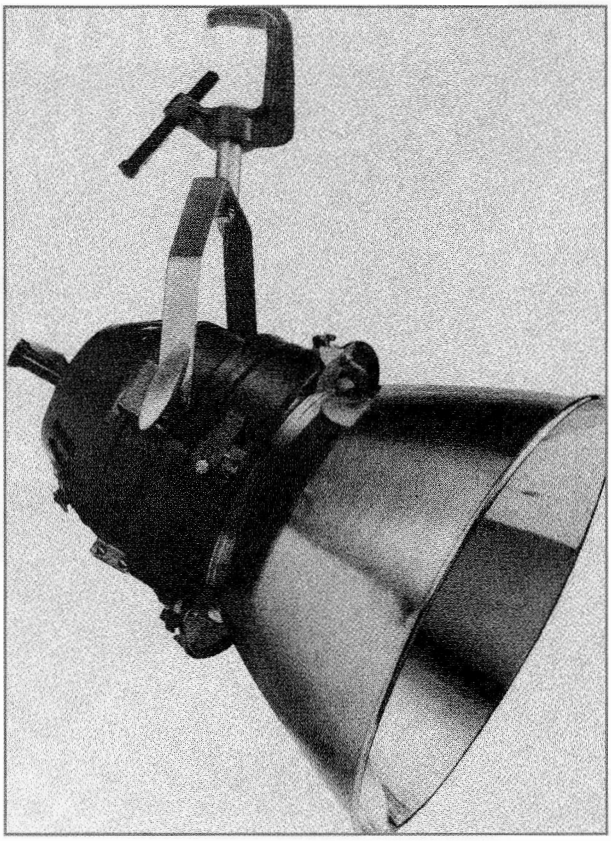
Yet, the PAR saw limited use as a solo instrument in traditional performance lighting, because of its fixed-size oblong beam and abrupt edges. It was not, however, without its fans: In the words of Beverly Emmons "I loved the 1K PAR and miss it today. I first used it as backlight with no color in 1967. The PAR can was perfect, as it was very bright and had no discernible edges. I have used the 1K PAR can almost continuously my whole professional life."

Shooting film and television on location placed a premium on efficiency, including the size, weight, and power demands of the fixtures necessary to deliver a given light level. In these situations, PARs had a clear advantage. They became popular, especially in six-light and nine-light banks, with a young generation of DPs and gaffers. Both PAR 36 and PAR 64 bulbs would be offered with integral CTB coatings for daylight fill, long before the first CSI/HMI fixtures appeared.

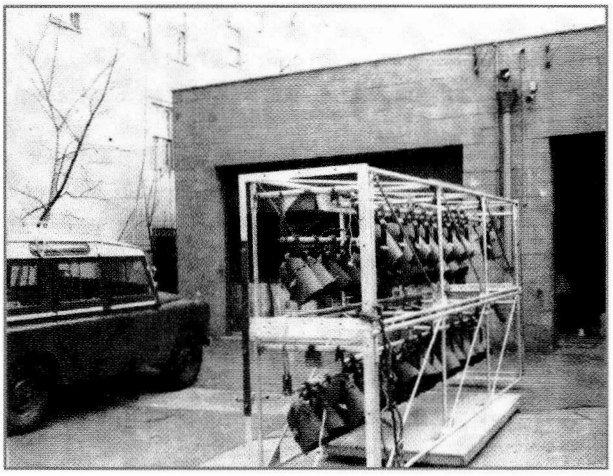
Television lighting designer Bill Klages recalls first using PAR 64s around 1960, for audience lighting.

Early concert lighting relied in large part on Altman's 2kW 8" theatrical Fresnel. Low Fresnel efficiency mattered because saturated color gels passed less light (Congo Blue later becoming legendary for only 5%). Low Fresnel efficiency mattered because saturated color gels had little transmission, (Congo Blue later became legendary for delivering just 5%.) The PAR 64 attracted interest and, in 1971-72, took the concert stage by way of two buildings in New York's East Village sharing a common wall: NYU's theatre school and Bill Graham's Fillmore East.

Chris Langhart taught and managed technical theatre at NYU, before his major involvement with the Fillmore and the Woodstock Festival. In 1971, he used Colortran Cine-



Before its adoption for concert lighting, the PAR 64, in single units and in six-light and nine-light banks, sometimes voltage-boosted by transformers, was popular in film and television lighting, notably on location. Several companies made a stubby PAR fixture, some (like this Colortran Cine-Queen) with accessory reflector snoots to boost intensity.



The 1972 Rolling Stones tour used Altman's new PAR 64 fixture in a double-row "pre-rig" truss design, one in which lamps could be moved between a shipping position inside the truss and use position outside of it. The truss had internal raceways supplied by multi-connector equipped multicable.

Queens (with glass color) to backlight The Moody Blues at Carnegie Hall, and his NYU class experimented with fabricating an extended barrel PAR fixture. John Tedesco had come to NYU, at which Jules Fisher had recruited him to bring *Jesus Christ Superstar* to Europe, where John connected with a young Dallas-based sound company called Showco.

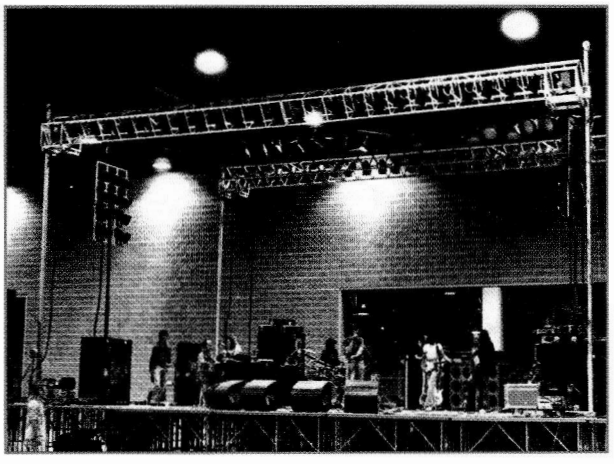
Chip Monck started up the Village Gate in 1958, toured extensively with folk artists, and lit the Newport Jazz and Folk Festivals. He'd used racks of twenty 8" Altman Fresnels supported on single-column hydraulic lifts on projects like 1971's Concert for Bangladesh.

John suggested the PAR 64 to Chip during the latter's preparations for the 1972 Rolling Stones tour. Chip brought a sample short-barrel PAR to Altman, with whom he had a long relationship, and ordered 60 for the tour.

Meanwhile, John combined the pneumatic Genie tower (suggested by Lee Erdman) with Altman's new PAR fixture (lengthening it 4" to improve gel life), producing the "light tower in a road case" first used by Showco with Led Zeppelin that same summer.

Altman's dominance of the subsequent US PAR 64 market followed from these two tours, and its (steel) fixture would be imported to the UK until British shops began building and buying lightweight aluminum units.

The Fillmore closed in June of 1971 and many of its technical staff went on to open a similar venue in London. At NYU that summer, Chris Langhart and Richard Hartman developed a rectangular "four-barrel" PAR64 bank, using Very Narrow bulbs (tested by shooting it at night down East Fourth Street), as a four-color additive color-mixing fixture.



A typical tour lighting system of the early 1970s. PAR cans were shipped and used while enclosed in "box" trusses, supported by Vermette crank-up lifts. Visible midstage is a "Genie tower," as introduced in 1972: a frame hung with PARs, elevated by a pneumatic mast originally designed for lifting materials on construction sites. With a dimmer pack riding along in the same large roadcase with PARs, frame, and tower, it was a self-contained, self-supporting lighting position that set up in minutes. The PAR's light weight was important, given the limited capacity of such lifts. Simple and rugged, it held up well under the rigors of trucking and of one-night stands.

Fabricated in the UK, it premiered in November, when the Who opened at The Rainbow Theatre.

Michael Tait worked as the Rainbow's house lighting designer for about a year. Preparing a tour for Yes, and having seen the Showco Genie tower on Zeppelin, Tait flew to Dallas to try and obtain some. Turned down, he built his own "Tait Towers," which would become the brand under which he later reinvented tour staging.

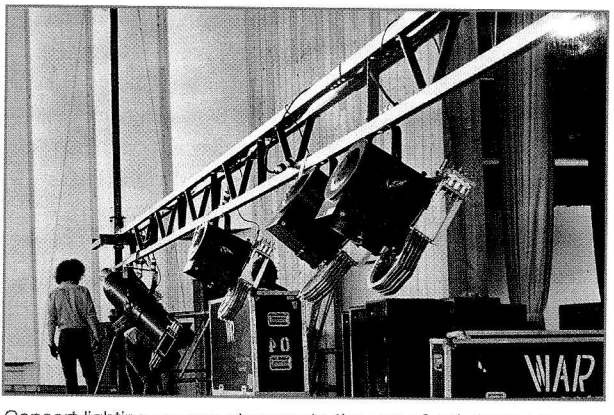
A willing prisoner of the PAR

Through the 1970s, the 1kW PAR 64 would remain the concert lighting industry's fixture of choice, supplemented with aircraft landing light bulbs in 250W and 600W sizes, and by PAR 36 banks used as audience blinders.

In large venues, at longer throws, the PAR was underpowered. It required several to punch up a given area—multiplied by four or five colors each.

The 1975 Rolling Stones' tour, designed by Jules Fisher, offered one alternative in the form of a nine-light PAR 36 bank with a snoot extension. Consuming a sheet of gel per show and relying on relatively short-life spot lamps, the concept didn't take.

In the early years of concert lighting, serious thought had been given to using mechanical color changers, so that a limited number of fixtures, whether Fresnels or PARs, would have much greater effect.



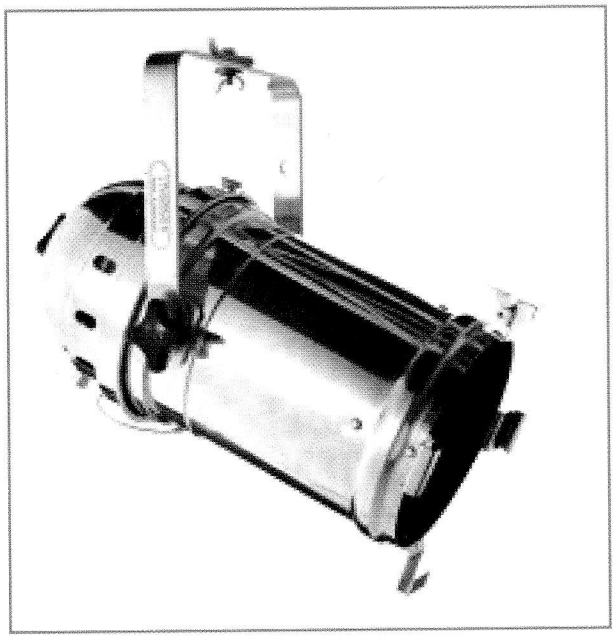
Concert lighting was no stranger to the use of gel changers. Here, the effect of a limited number of fresnels and lekos is increased by solenoid-operated "semaphore" gel changers.

In the late '70s, Keny Whitright introduced the gel color scroller, as a more compact version. His Colormax would (like earlier color changers) find a long-term home in theatre, maximizing the effect when limited lighting positions are available. In concert touring, for various reasons, changers were less desirable than simply carrying more PAR cans, which improvements in "infrastructure" (like increased use of chain motors and multicable) made possible. And, in an era before video walls, PARs and the structures supporting them became major scenic elements.

The high-water mark of PAR 64 concert use might have been an early '80s Van Halen tour, which, between scenic and lighting, carried 700 PAR 64s and a similar number in smaller sizes.

In the '80s, the refined descendant of 1972's double-row "pre-rig" Stones truss, with its six-can PAR bars and Socopex multi-cable, offered an efficient lighting solution beyond concerts, and around the globe.

Progressive lighting shops serving traditional performances would also begin adopting and adapting some of the "infrastructure" techniques used in PAR-oriented concert systems to increase the efficiency of touring theatre and dance, so that the road version of a show might more closely resemble the original production.



The Brits built PAR cans using spun aluminum for strength and lighter weight. Graham Thomas ran a local metal shop that made electric chicken coop heaters with the process; he would spin PARs for several shops before launching the James Thomas brand.

Moving on

In the end, concert lighting saw no better alternative to the PAR 64—at least, not one practical given the technology at the time. Its combination of simplicity, economy, and efficiency made it difficult to replace.

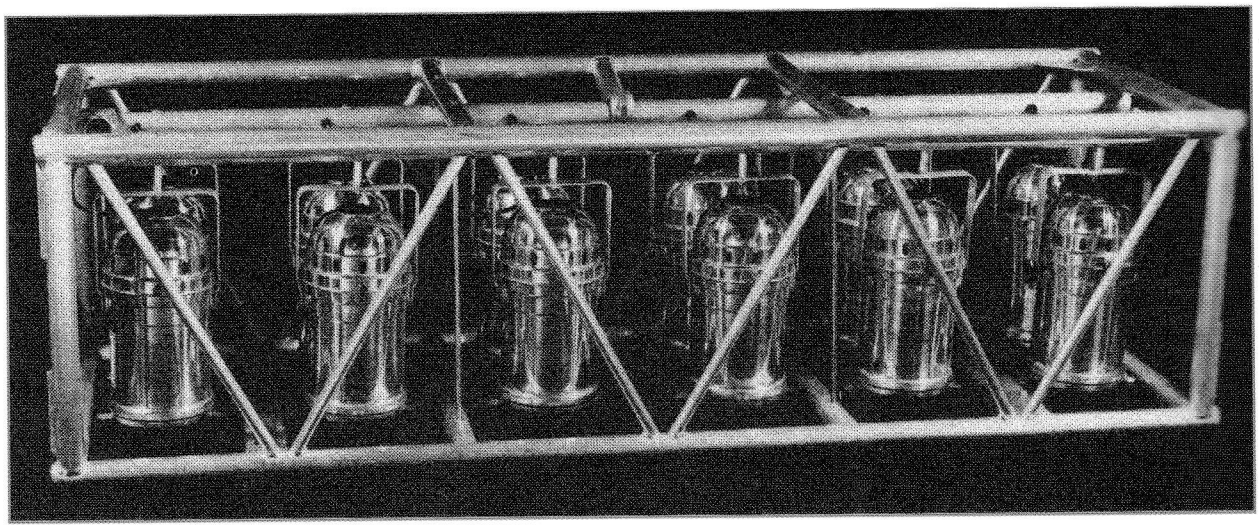
This challenge became relevant in the late 1970s, when the first Arab oil shock drove up the price of vinyl while simultaneously depressing the subsidies with which record companies had supported tours. Too many lighting systems were now chasing fewer tours, putting many of the pioneering American concert shops at a disadvantage, because they'd never invested in a more time- and labor-efficient infrastructure.

One of those companies was Showco.

To rescue its lighting business, Showco attempted a cheap and cheerful PAR 64 color changer. [It was an irony: In the early '70s, we had sought one to make 60 PARs look more like the 300 we now carried.] There would be no such lifeline. Showco was forced to liquidate its PAR-based lighting division—but the changer effort did lead to a prototype of a color-mixing fixture built around a small arc bulb—and then to the Vari-Lite VL1.

If color changers could shrink the lighting system, then what more was possible if all a fixture's beam parameters could be automated? The theatre consultant George Izenour had written of the idea in 1955, and a Swiss inventor built a 200-fixture system before concert lighting adopted the PAR.

Early moving lights would open the door to the PAR can's eventual retirement from touring, but they were too dim, unreliable, and expensive to do so immediately. Their

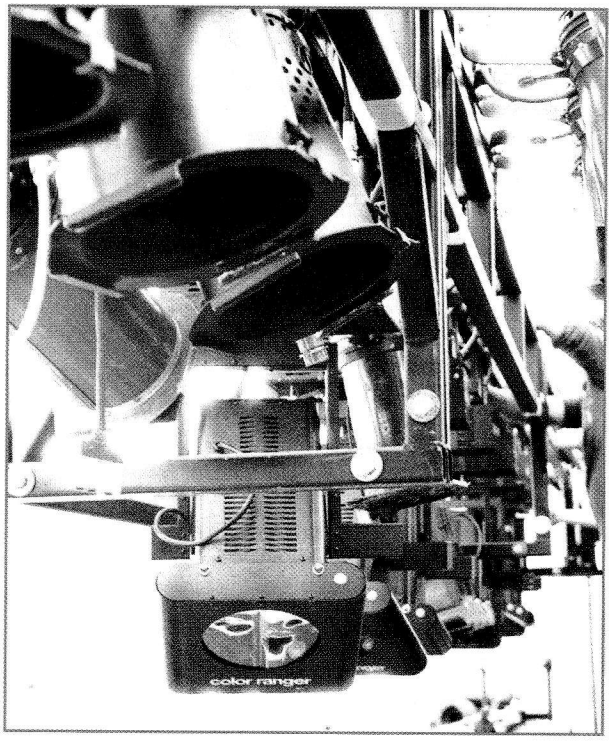


The Rolling Stones touring truss from 1972 had evolved by the end of that decade into a highly efficient "pre-rig" design still the same in principle—and to be used for many other kinds of event.

initial development was kept on life support by some acts' interest in renting them to enhance existing PAR systems with dynamic beam effects.

The PAR 64 soldiered on.

In fact, most early moving wash lights would be PAR cans with the addition of a color scroller and a motorized yoke. Adding little value to the PAR/scroller combination, they had modest impact.



Although offered to replace lighting systems full of PARs, early moving lights could do little more than supplement them. Until the early 1990s, most moving wash lights were PAR 64s with a motorized scroller and yoke—and were largely incompatible with physical structures optimized for the PAR can.

Morpheus's 1987 Fader Beam was a 1kW FEL in a variable curvature reflector with a CYM gel scroller. Vari-Lite, having been asked for a PAR-like mover since the arrival of the VL1, delivered the VL5 in 1992. But truly effective wash movers would need both color mixing and a discharge lamp—like the VL4 (1990) and High End Studio Color (1996).

Over time, movers became bright enough, reliable enough, and available enough to gradually displace the PAR, starting on "A-list" tours. And, over time, other lamps and light sources would take over other roles that PARs of various sizes had served.

HMI fixtures, for example, would deliver daylight fill on location more efficiently.

Performance lighting would adopt the MR16, which had first appeared in a projector in 1965. After many improvements in design, the MR16 would replace PAR and R bulbs

in display lighting, before doing so in striplights, where it allowed a narrower fixture, an advantage in tightly packed hangs

In the mid-'80s, TBA's Magic Lantern demonstrated that a more compact filament, a cold mirror reflector, and better optics could improve the Leko/ERS, a combination to be popularized by the Entertec/ETC Source Four ERS, introduced in 1992. Beginning in 1995, ETC offered a PAR-type fixture, using the same HPL lamp. With the higher-temperature-tolerant gels introduced over the years and reduced heat in the beam, a Source Four PAR didn't need an extended barrel, and it offered interchangeable lenses in different beam angles, albeit with a higher price tag and greater weight than a "can."

"A mild ray of light"

LEDs came along. Slowly.

Demonstrated in the 1970s, gaining in brightness in the '80s, and blue in the '90s, LEDs made their Broadway debut in 2002. Limited in output, they found their first uses in scenery, as eye candy, and as truss toners. A major appeal was changing colors without changing gel, making striplights an important early application, although it took another decade for them to produce a full range.

Progress in the performance of emitters themselves and in collecting their output and forming useful beams continues, but, as with movers, expectations have often outrun results.

Electric light bulbs were installed in London's Savoy Theater in 1881 and in Boston's Bijou in 1882. But the first incandescent spotlight (all of 50 candlepower) didn't appear until 1903. Kliegl Brothers, founded in 1896 and serving both theatre and film, described one in 1913 as a "new device for throwing light without an arc lamp," which "gives a mild ray of light."

As we've seen, a new light source is seldom immediately a new lighting solution. It takes years to improve the source itself—from the 1880s until 1913 to get to a 1,000W incandescent lamp.

Nor is a light source itself useful without a suitable package to harness and direct it. Another 15 years passed from the 1kW bulb until the Fresnel, almost twenty to the ERS/Leko.

The PAR's appeal was in its efficiency as a package for both incandescent and then halogen, whether in headlights, display, or entertainment.

The modern "PAR can" is itself an efficient package for the lamp. And, in turn, it became the nucleus around which a complete portable pre-rig lighting system was optimized.

As we lose the halogen PAR64 lamp, we lack a replacement for it offering anything like its particular combination of virtues.

More than a half-century on, the PAR64 remains a hard act to follow.

But we are also at risk of obsoleting the larger and very efficient lighting packages built around it.

Michael Callahan has been involved with lighting innovation since the 1972 Rolling Stones tour.