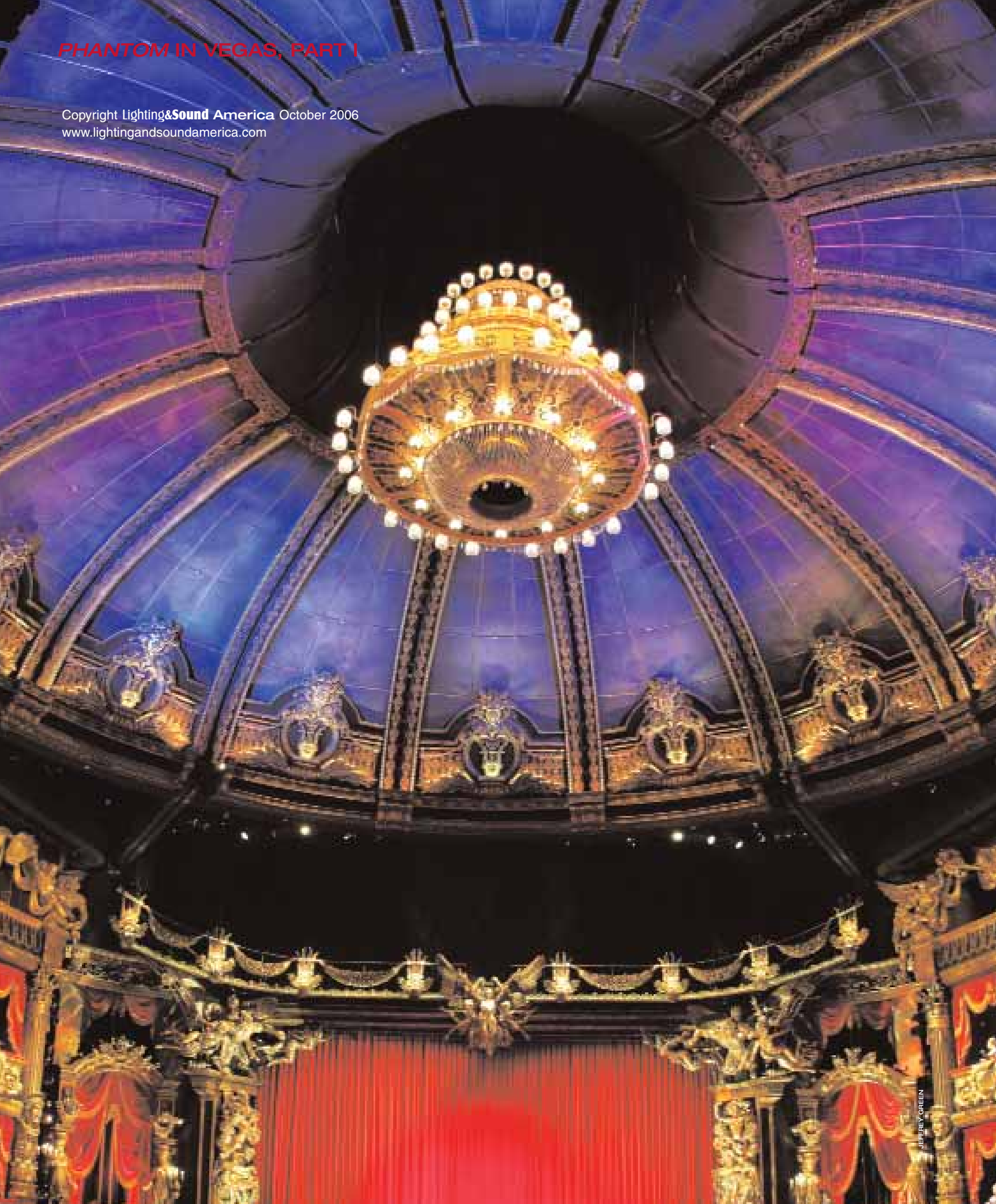
PHANTOM IN VEGAS, PART I



JEFFREY GREEN

JEFFREY GREEN

The Phantom's DESERT LAIR

Vegas gambles on Broadway with a super-sized version of *Phantom of the Opera*

By Judith Rubin

A coin toss was reportedly the deciding factor in permitting Anthony Crivello and Elizabeth Loyacano to step onstage as the Phantom and Christine Daaé for opening night of *Phantom—The Las Vegas Spectacular*. (The production, like most in Vegas, features double-cast lead roles because of its ten-performance-a-week schedule.) Then again, the Vegas *Phantom* is a coin toss in itself. The Andrew Lloyd Webber musical opened at the Venetian hotel/casino June 24 and is the latest attempt to clone the glamour of Broadway on the Vegas strip.

Devoted Phantomphiles can be reassured of the authenticity of the production, despite cuts that streamline it to a neat, 95-minute, intermission-free, zero-body-fat package. The storyline is clear, the songs are intact, and the spectacle, if anything, has been enhanced. This is essentially the same *Phantom*, with extra visual punch and a trimmer running time.

Under the direction of Harold (Hal) Prince, the production's original design has been augmented. In lieu of the great production designer Maria Bjornson, who died in 2002, her longtime associate, Paul Kelly, has kept the original's vision intact, while expanding it for the massive new theatre. The original lighting designer, Andrew Bridge, is back; while the original sound designer, Martin Levan, is credited, the current production is the work of Mick Potter.

The creative team made the most of a healthy budget—$40 million for the theatre and $35 million for the production—as well as advances in theatre technology and their familiarity with the show to make large and small improvements in staging and design. The resulting immersive environment and sleekly updated production include first-rate pyrotechnics and lighting, stunts, new backdrops and scenery, and the most active chandelier ever, all presented in the stunning theatre designed by David Rockwell.

Maria Bjornson's scenic design, overseen by Paul Kelly, and the work of architect David Rockwell come together to create an enveloping opera-house environment. Fisher Dachs acted as theatre consultant. Pelton Marsh Kinsella provided acoustical consultation. SECOA supplied and installed the theatre's counterweight rigging system.

Paris, Las Vegas

As everyone knows, the story is set in 1881 Paris in the fictional "Opera Populaire," a version of Charles Garnier's mid-19th century engineering marvel: the Opera Garnier, aka the Paris Opera House. With his 1,800-seat *Phantom* house for the Venetian, Rockwell has created a fantastic, bigger-than-life impression of the Opera Garnier, done up in ornate

COURTESY OF JOHN SALSTONSTALL

COURTESY OF JOHN SALSTONSTALL

Kelly: "I wanted to protect Maria [Bjornson's] work. It's a very delicate thing. If it were to fall into the wrong hands, it could reallly be vulgar."

draperies, faux gaslights, and Martin Smeaton's lush, romantic sculptures.

"It's a total experience. That's what makes it different from other Vegas shows," says Rob Bissinger of The Rockwell Group, who served as Rockwell's associate on the project. "The theatre's lobby is its own grand space—it alludes to the Opera House, but it has modern finishes. It grounds you in the reality of the present day, yet cleanses your palate, to get you into the world of the show."

Indeed, the lobby's ceiling is very high, with a sweeping staircase. It's the kind of space you don't see when you're walking through the casinos. In his work, Rockwell focuses on the creation of spaces where people can gather. Here, unlike other places in Vegas, people don't just file in; there's room to breathe, to get a drink. It's collective space.

In addition, the lobby of the theatre, which occupies the space formerly held by the Guggenheim Museum, is meant to allude to the 19th century, but in a modern way; for example, there's the presence of glass cubes with cut-glass chandeliers inside; they're classic elements trapped in icy boxes. Similarly, there's the theatre's exterior, which is clad in a stainless steel finish. The result is like a Fabergé egg—sleek on the outside, yet filled with rococo detail on the inside.

Inside the theatre can be found an extension of the original Maria Bjornson design. It is defined by golden, baroque details; plenty of swagged red draperies with gold trim; faux theatre boxes filled with sculptures of 19th-century theatre patrons; and an enormous dome, which contains the famous chandelier.

In designing the theatre, Rockwell followed Bjornson's stylistic lead in more than one way. Bjornson created the Opera Garnier onstage with fragmentation. Similarly, the Rockwell design employs theatrical artifice. The space, for all its details, is designed to have a floating, almost airy, quality to it.

To meet this goal, the interior employs many theatrical techniques. Of the several scenery houses involved in the project, Copper Creek Studios did the most work on the interior. In terms of major elements, Copper Creek built the 90' diameter dome, the three levels of side boxes, the decorative elements of the chandelier, and parts of pieces that surround the proscenium. The project included design, engineering, fabrication, electrification, and installation.

A key element in the design of the interior is the ornately carved baroque detail, as well as the statues of theatergoers in the side boxes. "We employed Martin Smeaton as our master carver," says Copper Creek's president,

John Saltonstall. “Martin is a carver in the English trade-school tradition; he’s centered in London, but he works all over the world, mostly in film. He worked on the original Broadway and West End productions, and was head carver for the recent film version of *Phantom*. He also has a long history in Las Vegas; his first project in Vegas was on the ships at Buccaneer Bay at Treasure Island. We also had staff from all over—Eastern and Central Europe, the Philippines, and the West Indies—who were amazing carvers.”

According to Saltonstall, the process went like this: “Paul Kelly and Rob Bissinger would start with drawings and scale models, along with period research. They would work with Martin and the other carvers, and then a maquette of an element would be carved. The hundreds of years of combined experience of the carvers and the eagle eye of Martin Smeaton came to bear when the final products were realized in the shop. Everything was ultimately cast in fiberglass, but first we made foam or clay models in full scale, then a mold, then we pulled parts from the mold to make the final work. After much sanding and finishing, scenic artists would take over and give each part the rich gold textures that make up the lush interior of the theatre. Most of the carvings were originals; however, for many of the architectural moldings and decorations we made a catalog of pieces and then repurposed them in different ways to make all the architecture in the theatre look purpose-built for each area.” By mixing and matching a limited number of elements, it was possible to create an impression of overwhelming detail.

Daniel Saenz, of Pelton Marsh Kinsella, the theatre’s acoustic consultants, says that his goal was “to create an environment that allows the sound to envelop audiences.” He notes that gypsum diffusers were placed behind the finishes on the walls to help create this effects; the acoustician worked with Copper Creek, establishing criteria for the surfaces in the themed surround.

Fisher Dachs Associates, the theatre consultants, played an instrumental part in the design of the room and its sightlines. Adam Huggard, the firm’s lead designer, says that when work began on the building, the show it was to house was not yet chosen. “We suggested the Opera Garnier and the dome, when it wasn’t a popular idea," he says. “We knew that *Phantom* was only one of the possibilities for the space, although it seemed the most likely.” Saenz adds, “The dome is acoustically transparent, so there’s no focusing effect on the audience. It’s constructed out of a cloth material that allows sound to pass through; there’s also a substantial amount of fiberglass in the roof deck, which serves to quiet the chandelier's motors.” (See sidebar for more about the chandelier.)

Huggard notes that many choices made for the theatre came from an unusual source: “We incorporated what the hotel’s hospitality staff told us that audiences would tolerate. For example, they won’t climb stairs and they don’t like elevators. That’s why the Venetian didn’t want a balcony, which we fought for. It’s very interesting, talking to hospitality people, with thousands of pages of marketing research about who’s coming to the show and how they’ll react. They can even tell you what colors to paint the walls.” Overall, he says, “We tried to stay away from the Broadway theatre model, because it seems they don't fit the Vegas mold.”

The most theatrical element of the theatre’s design is the way that it is revealed. Audiences enter the space and see the walls covered with dustcloths. This sets the scene for the musical’s opening, set years after the main action of the play, in a ruined opera house whose furnishings are being auctioned off. Then, as the scene ends and the show’s musical prologue begins, the dustcovers vanish and the chandelier rides to the ceiling. “As soon as you look away to the chandelier, the dust covers are moved,” says Bissinger. “It’s the best magic trick; suddenly the theatre is all around you. But there’s not as much detail as you think there is—that’s the theatricality of it.”

A grand opera house

Thanks to a scheduling anomaly, in which the schedules for theatre construction and completion of the show dovetailed, the theatre’s construction was a race against the clock, with work beginning on the show long before the building was finished. “We got to Las Vegas around the end of April 2006,” recalls Kelly. “There were constructions cranes on the floor and we were installing in hard hats. It was a complete breech birth.”

Huggard adds, “It was a harrowing process, because changes had to be made even as the production was progressing, which was taxing on the builders.”

Kelly began his association with Maria Bjornson on the Broadway production of *Phantom*. He spent most of 1987 to 1995 criss-crossing the continent and configuring *Phantom* for grand prosceniums in Vienna, Stockholm, and Basel. He then migrated to the feature film industry. He’d spent a good decade art-directing films and was working *Prime*, starring Meryl Streep and Uma Thurman, when he got wind of the Venetian project. However, he was initially reluctant to re-enter the Phantom’s lair. “I heard about it one night at the opera, where I bumped into Artie [Harold Prince’s associate director Arthur Masella]. He mentioned *Phantom Las Vegas* and I just cringed. I said ‘Good luck, bye-bye.’ That was in April ‘04.”

But *Phantom*’s grip on Kelly proved to be irresistible, and, ultimately, the designer couldn’t stay away. “In July ‘04, there was a big article in *The New York Times* about Las Vegas becoming the new Broadway. It was mostly about *Phantom*, and listed the team members. The biggest question was, who was going to design the

production? Maria was had passed away. I thought, I should do this. I wrote to Hal the next day. On a personal level, I wanted to protect Maria's work. It's a very delicate thing. If it were to fall into the wrong hands, it could really be vulgar. It awoke a protective something in me."

Kelly joined creative discussions with Prince in fall 2004. "At first, it was a little scary, intimidating. I felt I'd forgotten things. But it all comes back to you. I just kept sitting through the New York show and visualizing what the Las Vegas production would be. I pulled out all my old souvenir books." It was a headlong creative process and the team used its limited time efficiently. "By mid-January 2005, we had staff and were in the studio. We had a model at the end of May that included the design of the auditorium, coordinated with Rockwell."

Maria's world

Making the show intermission-free meant creatively stitching together places where the leisure of a dropped curtain and formal scene change no longer existed. Those transitions had to ring true to Bjornson's vision. As the self-described "style guide," Kelly played a key role. "I knew Maria's work so well—had worked with her for so long. I walked a fine line; I couldn't put too much of myself into it. It should all look as though it still came from Maria. I made it as seamless as I could."

A notable example is the luminous opera house façade that provides continuity between the first and second acts. This entirely new piece of scenery, a stylized representation of the Opera Garnier exterior, rises up in three glowing, backlit sections that span the stage and open the "Masquerade" scene, falling away to reveal the grand staircase rotating toward the audience and filled with masked revelers. Explains Kelly, "It was Hal's concept to come in from the outside, as opposed to the original production where Act Two opens in the foyer. It's my design, but it looks like Maria's. Maria loved false perspective."

The telescoping central part of the façade unfolds first and begins to straighten up, followed by the truss-mounted flanking segments, which fly in from the wings, attach to the center, and raise the triptych to full height while the staircase concealed behind moves into position. "In the original show, the second-act scenery included a huge drapery that revealed the staircase," says Kelly. "Here, we spin the staircase and you just see the tail of the drape. It's classic *Phantom*."

Another major difference in staging was the placement of opera-house boxes on either side of the forward part of the auditorium. In all past productions, these boxes have occupied stage right and left. Here, Kelly incorporated them the theatre layout. According to him, the creative team floated a number of concepts for the boxes, including making them into VIP seating for live patrons, or filling them with a combination of live actors and mannequins. Access and egress for the latter options would add to construction costs, and the Venetian shied away. "So," reports Kelly, "we said, 'Let's really turn it into our show, make it Maria's world.'" Life-size mannequins representing upper-crust opera-goers of the time populate the boxes, dressed in period costumes created by Sue Wilmington, Bjornson's

MAKING THE CHANDELIER FLY

The chandelier can plunge 45' in three seconds. It is made up of four interlocking tiers that start out in separate locations, then come together at the beginning of the show.

All previous *Phantom* productions have featured a single large chandelier that begins its journey onstage in the opening auction scene and then flies over the audience to position itself for the crash later in the show. However state-of-the-art they once were, by today's standards, they're very slow.

The Vegas chandelier could be described as a 32-axis robot, or an electromechanical multiple organism possessing considerable artificial intelligence. Forty-five engineers, programmers, and fabricators worked to give this one-ton, $5-million light fixture the ability to plunge 45' in three seconds—and more besides.

The chandelier is made up of four interlocking tiers that start out in separate locations. Each appears to be an individual light fixture. One hovers unnervingly low over the orchestra seats; two are suspended near the ceiling and the fourth sits onstage awaiting auction. When the big moment comes, all four fixtures begin to move and are soon circling overhead in a sort of planetary dance that culminates in their lining up vertically and joining together into a single unit that retracts up into the ceiling. It will re-emerge three times: once for a stunt scene where the Phantom begins to descend into the theatre through the center of the fixture; once for the famous drop scene, which has

original associate costume designer. "They provide a transition from the *Phantom* world to the vernacular world of the auditorium," comments Kelly. "It kept us in Maria's world."

Moving the boxes offstage opened up spaces that begged for more scenery. For the opera-within-an-opera and ballet vignettes, new, custom-painted opera backdrops were commissioned from Scenic Arts Studios and Michael Hagen Studios. "Not everyone can make a classic backdrop like this, in the old style of scenic painting," remarks Kelly.

The opera-house façade, as well as the machinery that moves it, were the work of Scenic Technologies. Hudson Scenic built and automated the show proscenium, front-of-house managers boxes, and the "Masquerade" staircase. The latter, says Rick Mones of Hudson, "has three axes of automation; it's an 18,000lb. piece with the riders and mannequins on board." Hudson also did the Phantom's gondola, which is a wireless radio control unit, driven by a stagehand operating a joystick offstage. "It's a hybrid system of components from different manufacturers, which we put together," he says.


JEFFREY GREEN

Another new element is the mirror in Christine's dressing room, through which she gets pulled into the Phantom's world. "It's a scrim mirror; you can frontlight or backlight it," says Mones. "The show brought in an illusionist to help plan it out."

Overall, he says, "a lot of the show was given to the people who knew these particular pieces the best, from previous productions."

Fred Gallo, president of PRG Scenic Technologies, says his company's contribution included the automation deck, including the lifts and sloats. The lifts include special high-speed units that allow the Phantom to appear and disappear quickly. Other elements built by Scenic Technologies include the opera-house façade and its mechanics, which allow the façade to raise and lower. "In New York," he says, "a small Lexan facsimile of the Opera House comes up from the stage. In Vegas, an

been moved from the end of the first act to the climax of the show, and once to take a curtain call.

A complex network of slender cables (1.5 miles' worth of 1/4" wire rope non-rotating aircraft cable, to be exact) connects the chandelier segments to the ribs to mobile cable pulleys that travel within the ribs of the theatre dome and guide them in their movements. Each rib of the dome is a chandelier-track—in fact, the track specs literally dictated the shape of the dome. "There was only so tight of a bend we could make in certain areas. The only places the bend limitation affected the shape of the dome is where we made the 90° bend up to the vertical section; for the rest of the curve profile, we followed the shape that Rockwell had drawn," said Scott Fisher, whose company, Fisher Technical Services, designed, engineered, and built the chandelier system, working closely with the building's structural engineers. Fisher precision-fabricated the track framework before handing it over to the scene shop.

Fisher and company have done much stunt-tech and stunt-scenery work for theatre, theme parks, and films, but this was the first chandelier. "We were jazzed about it," he says. Programming the chandelier to "crash" was simple: an up-and-down movement. The challenge was to create and control flight paths for four individual chandelier segments moving along curved tracks to travel simultaneously in three-dimensional space. Furthermore, the pieces had to share space without colliding, even though the geometry of their flight envelopes was constantly changing. The largest segment is 16' across and weighs 600lbs. Two others weigh 500lbs each; the smallest is 400lbs.

Fisher has built other rigs for manipulating objects in three-dimensional space, but they employed straight tracks with the lines attached to the flying object at a single point. The chandelier rig was vastly more complex, involving 1,800 pulleys and 32 winches. The dome has 16 ribs radiating out from its stovepipe center (where the chandelier resides between appearances). Each chandelier segment tracks along four of those ribs, with one point of attachment per rib.

enormous Opera House rises up from the trap room; it's approximately 29' tall. It stops for a minute while traveling legs, one at left and one at right, come on and attach to the façade and the whole piece flies out. It's a very heavy, unbalanced piece both in the trap room and in the flies. We have very, very large winches driving it out of the floor, and another set of winches driving it into the flies."

Gallo and his crew also built the production's travelator, used in the scene in which the Phantom takes Christine into his netherworld beneath the opera house. A larger version of a similar effect seen in other *Phantom* productions, it consists of two towers, at stage left and stage right, with a bridge between them. The bridge moves up and down, creating a feeling that the characters are stepping further and further into the opera house's depths. All this automation and motorization add up, Gallo says: "We have a total of 105 effects in *Phantom*—53 effects in or below the automation deck, 10 playing on the deck, and 42 effects in the flies [15 of which are the dust-cover suck ups in the front of house], all being controlled by PRG's StageCommand System."

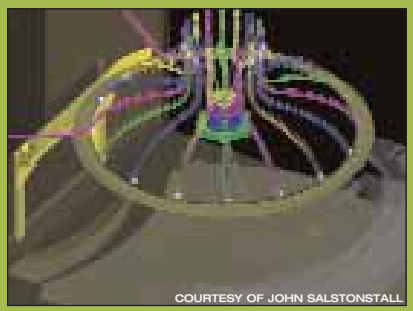
And then there's Raoul's cage, an effect not seen in any other production. Here's what's happens in London, New York, and on the road: "Near the end," says Gallo, "when the Phantom gets Raoul down in his lair, he takes a hangman's noose and ties it around his neck; it's pulled upward, leaving Raoul on his tiptoes." In Vegas, however, "Raoul stands on a certain spot on the floor and a 8' tall cage is driven out of the deck in one second, surrounding him." Thanks to lighting effects that distract the audience, the cage seemingly appears out of nowhere. "Once Raoul realizes he's trapped, 45 knives are triggered that point towards his body. Then the Phantom levitates the cage 6' above the floor." Scenic Technologies built the cage and the automation for it.

In addition, I. Weiss worked with Kelly on the recreation of the design intent of all original decorative show drapes, such as the front and reverse tableau curtains, and the "Masquerade" ball gauze drapes, which were fabricated of custom silkscreened silk. The custom fringe for these curtains is very detailed and enormous in size--some are taller than 24". Weiss found inherently flame-retardant substitutes for the original trimmings, which made unnecessary the painful process of re-treating them regularly. The company also supplied all masking curtains, backdrops—in cooperation with Hudson Scenic—and the dust covers for the opening auction scene. I. Weiss also supplied all decorative front-of-house draperies (for the faux opera boxes), which were made of embossed, inherently flame-retardant velour, and luxurious trimmings (tassels, fringe, and braid) to match the color scheme of the theatre design.

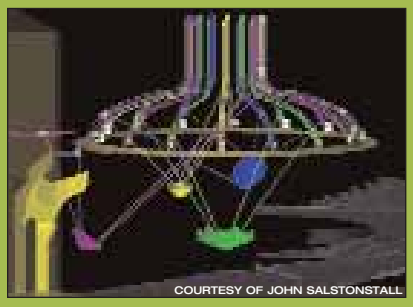
Reinventing the design

Having ample space, a healthy budget, and a Vegas license-to-dazzle, the creative team looked for ways to improve and extend the Phantom's subterranean quarters. "Hal and I sought the feeling of that grand-opera European experience," says Kelly. "In Vienna, I had a stage depth of a city block, which was great for the boat trip and for bringing in horses." He had the luxury of a relatively

MAKING THE CHANDELIER FLY



COURTESY OF JOHN SALSTONSTALL



COURTESY OF JOHN SALSTONSTALL

Each pick point is controlled by two winches: a travel winch and a lift winch. The travel winch moves that point along the track. The lift winch makes the cable longer and shorter. The winches live in a 10'-high catwalk area between the dome and the theatre ceiling, along with eight equipment racks. (Each rack controls four winches.)

As Fisher describes it: "We end up with four chandelier pieces, each suspended by four lines, with each line being moved by four more winches, so it's able to move though the full length of a 52'-long curved track system that doubles as the ribs of the dome over the audience. All while simultaneously maintaining 3-D flight path integrity, position compensation for the track curvature, position compensation on the lifting winches vis-à-vis the position of the traveling suspension points, flight envelope safety monitoring, and anti-collision monitoring between the pieces of the chandelier, the suspension lines, and the walls and ceiling of the theatre."

The result is a performing chandelier that looks good from anywhere in the theatre, whether you're underneath, cringing, or up in the balcony, gasping.

Before committing anything to steel, Fisher used in-house, proprietary automation software to simulate and program the rig in a 3-D computer environment. The control system that directs the movements of the rig, with

deep stage in Las Vegas and made the most of it. "Maria's lair had just one arch: I made three," he says. "I borrowed even more space from the loading dock to do it."

"We used careful judgment to decide when and how to push something," adds Kelly. "We knew we had a little more money to spend, but in the end we had to make cuts, even with $35 million."

Some very effective changes came from tweaking the details. The Phantom's Christine-bride doll is made to burst through its glass case when Christine sees it. "Originally, you saw her after the glass had been broken, but here, she pops through while you watch," says Kelly. "It's much more dramatic." It was on Prince's wish list to improve the Phantom's boat, which doubles as the bed in which Christine wakes up from her fainting fit. "The original didn't read much like a bed," says Kelly. "We made it sexier, more elongated and created a bolster to prop against a kind of headboard."

Besides Raoul's noose, an earlier scene that depicts a hanging in shadow was ramped up to cast that shadow much larger than in previous productions. The near-slapstick effect it creates is abruptly stifled when the victim behind the curtain is revealed: a man and not the stuffed dummy of the other *Phantom* stage productions.

In addition, the Vegas production features extensive pyrotechnics. Matt Dillingham, of Advanced Entertainment Services, acted as special effects designer and coordinator, and AES supplied all the equipment and materials. According to Dillingham, "There are 48 pyrotechnic effects used in the show, as well as 14 natural gas effects." Besides AES' custom units, equipment includes, from Le Maitre, five Radiance hazers, four Stage Foggers, seven LSG units, and six Twister fans, plus, from Look Solutions, three Viper Smoke generators, and one Power Tiny fogger. Non-pyro effects are controlled by an ETC Express 125 console. Pyro, from Sigma Services, is triggered by a Surefire system.

Whatever the additions, the vision remains Bjornson's. In need of material to fill out the scene in which Christine visits her father's tomb, Kelly consulted the extensive Bjornson archives. "Her body of work is set up in a building in Red Lion Square in London, administered by Robert and Olivia Temple and Michael Lee [www.mariabjornson.com]. It's a mind-boggling inventory. Michael pulled out a stack of about 25 pen-and-ink drawings I had never seen, which included a sketch of a bride lying horizontally, as if in a coffin." Kelly located an old photo of a model for a wider, three-part version of the tomb, which he used as a basis to design the set for the more capacious Las Vegas stage. "Jonathan Allen, who did the original 1986 production with Maria in London was also a great help," he adds.

Ultimately, Kelly sees the staging of this *Phantom* as more unified. "Previous productions were more like two shows: the one onstage and the one in the audience. Here, you're much more in the midst of it. Everywhere you look, anywhere you sit, you're surrounded by it. And you really feel like you're in an opera house. Las Vegas has a new toy to play with."

accuracy within 1/8", is an adapted military system Fisher employed for earlier projects, including flying a live stunt man around at 75' per second using high-speed winches, for the *Spider-Man* films. (The same system is used for NFL games, to fly the camera over the field.) To operate the chandelier rig, this system was set up with 40 separate computers, each having a measure of autonomy. "They all talk to each other and share the work—there's no central point of control," explains Fisher.

The system, which took about 10 months to design and develop and about four months to build and install, contains "a lot of safety redundancy, with multiple computers watching multiple aspects," says Fisher. "If the system hangs up, no matter where, it has a way to escape from what it's doing and return to neutral. If one of the machines can't move, if a major piece of gear goes out, the system will protect audience safety." There is also a human operator in a position to activate the system on cue—or not.

"There were elements of the techniques required to be found in some other industries," says Fisher. "Three-D manipulation has been done for camera flight for film and broadcast. Three-D tool path manipulation has long been a key element of industrial robotics, and some fairly hard-core R&D work on cable-suspended devices had been done by the U.S. National Institute of Standards and Technology for a materials-handling project called 'Robocrane.' But, as our research indicated, nobody had done the 'moving suspension points' thing before, much less moving points along a curved track, and certainly not 16 of them at the same time. We got some of our pre-visualization and simulation tools from animation and video game design, but even that had challenges with regard to actual dynamics simulation, and required even more original work on our part."

In addition, the wireless system for the LEDs that light the chandelier was by Howard Eaton, of Howard Eaton Lighting Ltd.

PHANTOM IN VEGAS, PART II

JOAN MARCUS

PHANTOM

LIGHTING AND SOUND

The long-running musical gets a 21st-century technical update

By David Barbour

One of the opportunities presented by the new Vegas *Phantom* was the chance to revisit the production's lighting and sound. As the longest-running musical in Broadway and West End history it remains technically frozen in time.

Consider this: the London and Broadway productions, now over 20 years old, were designed before moving lights made their way into the theatre. "We designed it in 1985," says lighting designer Andrew Bridge. "The most exciting thing in the inventory is the CCT color changer, which was really hot stuff at the time. I think I even managed to get some Altman lekos and a few Strand Cantatas." He adds that the show also featured a new piece of gear called the Howie batten, named after Howard Eaton, then the show's production electrician and now head of Howard Eaton Lighting Limited. Readers will recognize the Howie as the MR16, or birdie, strip.

As a further sign of the design's venerability, Bridge adds, "We didn't have computers, so many details weren't documented. The design is a pen-and-ink drawing."

And that is pretty much the way *Phantom* remained for a long time. "In the major 'A' license productions," says Bridge, "including London, New York, Tokyo, Canada, and the American touring companies, the designs were very similar, as we had total control of the specifications." He adds that the design ideas were always the same but the spaces were always changing. "If you did not do your homework and lots of preparation, things just wouldn't work and the show and timetables would burn you. You had to watch the trim heights, where the proscenium was in relation to Bay One, etc., or you'd really come a cropper. As territories expanded, we had to change the specifications to suit local equipment and venues and, therefore, the rig started to change.

"*Phantom*," he adds, "is quite a precision show. It uses chiaroscuro, and darkness is our friend. What you don't light is as important as what you do, or you'll give away the tricks in the transitions [of Harold Prince's cinematic staging]." He adds, laughing, "I know at Her Majesty's Theatre [the show's London home], when they rent the building out for other events, visiting lighting designers are up in arms, because there are no moving lights!"

Eventually, some changes found their way into the show, but they have happened, Bridge says, "only quite

JOAN MARCUS

The number "Masqueade." The actors wear DPA 4061 mics combined with Sennheiser EM1046-RX receivers and SK5012 UHF transmitters.

recently, with the 'B' Licenses [smaller touring editions], where we had to help the producers by allowing them to add local gear. The first companies that went to moving lights were in, I think, Korea and Scandinavia; instead of using expensive Reich & Vogel beamlights, we had to use moving lights, because they were available." Also, he says, the show's light curtains were difficult to maintain on the road and were eventually replaced with moving lights. And "some kinetic wheels that make water and candle effects have been replaced with [Gamproducts] TwinSpins and things like that."

Another interesting change that took place during *Phantom*'s lifetime was the rise of ETC, with its brighter, cooler conventional lighting instruments. "Obviously, the Source Fours came into the industry," says Bridge. "They're a bit of a problem sometimes, because the balance of the show isn't very bright. If you put in an old leko that's running at 50% with a new Source Four, you have to run the latter at maybe 30%."

This is because, he says, "my original work was based on the idea of lighting shows by gaslight. In 1890s Paris, you didn't have enormous amounts of lighting. That concept has held up through the years. We have very flat front-of-house lighting from the balcony rail, which makes shadows on the backdrops. There's not too much crosslight. It doesn't need to be a high-tech show."

Nevertheless, like everything else in the Vegas production, the lighting has gotten a major technical upgrade, with some very up-to-date gear. "It has been interesting," says Bridge. "The pictures are the same. But it was a chance to experiment. My two original collaborators—Vivien Leone, who was in charge of the American circuit and Mike Odam, my associate from Europe—were there. They have every different eyes—she has the American point of view and he knows the international productions—with me as the mediator. It developed nicely that way."

As has already been mentioned, the tech process was complicated immensely by the fact that the building was nowhere near completion, leaving the crew to work under highly unusual circumstances. "They loaded in the deck and there wasn't a roof on the grid," says Bridge. "Then a storm trashed everything. We had the rig up, but there was no electricity and no wires. A week or two went by, and we got stage left wired, then stage right. We managed to do some pre-tech at the production table while they poured the cement. We had hard hats as we lit, with no auditorium walls, the working lights on, and sirens going off. The dust was appalling. Lighting the show was a joy—when you could see the stage. I counted, on average, 75 construction people working while we were focusing, all painting, and banging, and doing God knows what."

To top it all off, he says, "We were supposed to have four weeks of previews and it was cut to a week and a half."

New technology, gaslight effects

Of course, this *Phantom* has a completely new light plot, which is loaded with moving lights, including 20 Vari*Lite 3500Q Spot units, 12 VL2500 Spots, 33 VL1000TS fixtures, three VL500s, four Martin MAC 2000 Performances, nine Mac 2000 Profiles, eight Mac 2000 Wash units, 20 High End Systems Studio Beams, three High End Studio Colors, and four Reich & Vogel 500W Beamlights on City Theatrical AutoYokes.

The conventional rig includes approximately 428 ETC Source Fours of different types and sizes, along with 12 Altman 3.5" Ellipsoidals, 16 Altman PAR 64s, four PAR 36 units, nine Strand Fresnels, 121 Strand Mizar Fresnels, 57 Thomas Birdy MR16s, seven L&E mini-tens, and approximately 55 L&E Ministrips and Nano-Strips. Strobes include one unit from Lightning Strikes, 15 from Martin Atomic, and four from High End Systems. Two Reich & Vogel 500W Beamlight followspots are used, as well as four units from Robert Juliat: two Cyranos and two Super Korrigans. Additional gear includes four Ocean Optics Seachanger Color Engines, 133 Wybron Coloram color scrollers, 86 Gamproducts TwinSpins, four GAM EFX Plus2 Wheels, and City Theatrical radio-controlled dimmers. Tomcat truss is used. The dimmers are ETC Net2. Control is provided by a High End Systems Hog iPC. Lighting equipment was supplied by PRG.

One new challenge was the lighting for the large opera façade piece, which moves up and down and is new to the show. Larry Dunn, of City Theatrical, describes how it is lit: "Scenic Technologies asked City Theatrical to provide engineering support as well as provide the integrated WDS system. The system includes a CTI 5500 WDS transmitter, 22 CTI 6265 PDS-375-TRB wireless Color Kinetics controllers with custom mounting hardware, 18 CTI 5520 WDS 15A dimmers, two CTI 5580 WDS candle adapters, and two large battery banks with CTI custom DCV distribution panels, as well as a number of smaller battery systems. These battery systems include both 12 and 24VDC systems, and CTI also provided charging equipment and spares. Lighting fixtures include 101 Color Kinetics iWhiteBlast 12s, twenty-three MR16 Birdies, 27' of TPR Westflex LED strips, three TPR fiber-optic illuminators and 15 Howard Eaton Lighting Ltd. flicker modules. All lighting equipment on the set piece is controlled via WDS Wireless DMX and powered from one of the CTI battery systems. The Howard Eaton flicker modules are controlled via WDS dimmers equipped with WDS candle adapters. Howard Eaton also used WDS OEM receivers in the custom wireless chandelier system they developed, allowing all of the wireless equipment on the show to be controlled with the same WDS system."

At the same time, all this gear, new and old, was put to the use of preserving the look of the *Phantom of the Opera*, while allowing for the additional flourishes of the Vegas production. "The pictures are the same, but the transitions are new," says Bridge

He adds that, in spite of everything, the experience was pleasurable. "Hal Prince's enthusiasm was superb. Gillian [Lynne, the choreographer] came up with new ideas for [the production number] 'Masquerade.' That was the fun bit—the collaboration. And the international team spirit was alive and kicking in the lighting department." Even with the moving lights, the LEDs, and wireless dimming, the result, for him, was a pleasantly old-fashioned experience. "I came straight from *Sinatra* [the West End musical, extravaganza featuring lots of projections]," he says. "Going back to the 19th century was a joy after that."

The virtual opera house

If working on *Phantom* was like the latest gig in a 20-year marriage for Bridge, for Mick Potter it was something else altogether, as it was the first production of *Phantom* that he has designed, creating an entirely new

COURTESY OF VIVIEN LEONE

Right: This overhead shot taken during tech gives a sense of what the process was like. Look closely, and you'll see the hardhats worn by the lighting personnel.

sound system. (Potter has designed all of Lloyd Webber's recent shows.)

Just as everyone else struggled with the problems of designing a show in an unbuilt venue, so Potter and his associate Paul Gatehouse worked to make a viable sound system in what he calls "the virtual theatre."

That was one of the hardest things," he says. "I'm used to working in the West End or on Broadway, where you can take loudspeaker systems and try them out in the theatre, and work in detail with an actual space. Here, I was working with a virtual theatre. I used the Meyer MAPP acoustic prediction system to fine-tune the system design, and would send the data to PMK, the acoustical consultants, who would use it with their EASE data; this gave me a fighting chance of coming out with something really workable. One benefit of this is that we did have control over the acoustics of the theatre in terms of deciding the overall reverb time."

And, again, there was the challenge of working out the sound of the show as the walls were going up. "We were literally there at 2am, waiting for the construction workers to get down to a core crew of 50, so we could work," Potter says. "By the time we were wanting to tune the system, there's wasn't really a space to work in. Garth Helm, the production engineer, did an amazing job getting the system installed on schedule."

All of this work took place while Potter was working on other shows, including the Broadway production of Lloyd Webber's *The Woman in White*. "I went to the first meeting for *Phantom* in June 2005," Potter says, "and it was almost exactly a year later to the opening. The *Phantom* dates also changed, so I ended up with *Evita* in production in the West End at exactly the same time as *Phantom*. I certainly earned lots of air miles and Paul did a great job keeping the show on track."

JOAN MARCUS

Bridge's design makes use of chiaroscuro effects. "In 1890s Paris, you didn't have enormous amounts of lighting," he says.

The MAPP system, he says, "will show you how the loudspeaker systems will interact with each other, but not the space. That way, I could accurately give predictions about their interaction; and then make predictions about how the space would interact with the audio."

And there were plenty of loudspeakers to map out. The theatre's sound system takes in hundreds of enclosures. All the main systems came from Meyer Sound. The main proscenium right, located at left and right, includes 18 MICAs, four 600-HPs, two 700-HPs, and four CQ-1s. In the center cluster are 20 M1Ds. Providing front fill, side fill, and delay are eight Meyer UPJ-1Ps, two more 700-HPs, ten UPM-1Ps, and six UPM-2Ps. Processing for these is via four Galileo 616 digital loudspeaker management processors.

After that, more companies are added to the mix. For foldback, there are 22 d&b audiotechnik EO-LS units, 11 Meyer UPM-1Ps, and eight JBL Control 1s, along with one Lab.gruppen four-channel amplifier. The surround system is by d&b, including 68 EO-LS enclosures, and six E12-LS subwoofers.

For sound effects, there are 22 Meyer UPJ-1Ps and seven JBL Control 1s, with processing and amplification provided by three Galileo 616s and 18 d&b D12s.

Adding to the challenge of such a large system was the brief that, if possible, none of the loudspeakers should be visible, thus preserving the theatre's Opera Garnier aura. "By the time we got the MICA proscenium line arrays to fit within the set," says Potter, "we had less than 4" to spare—and this was before they'd built it! Paul Kelly and his team were great in helping incorporate the speakers into the set."

The cast sports DPA 4061 mics—popular in the theatre because they're tiny and hard to see—combined with Sennheiser wireless gear, a mix of 40 EM 1046-RX receivers and 38 SK5012 UHF transmitters. Here, says Potter, the DPAs "were essential because, in this production, a lot of the action has been brought further downstage. There's now an apron in front of the proscenium, which there never has been before, and, of course, Hal Prince wanted to use it." This means, however, that "about 40% of the show happens downstage of the main loudspeakers. It's not ideal, but I knew it would be so. Thanks to the DPAs and Meyer loudspeakers' off-axis rejection, we can do the show on omni head mics in front of what is, in fact, a huge concert system."

Controlling the sound is a Yamaha PM1D digital mixing system ,processing over 150 inputs and 80 outputs. Given the need to program in surround and the production's many sound effects—especially the number of voiceovers, principally from the Phantom—and given the fact that there are two actors covering each of the three lead roles, plus two understudies each, a digital console was clearly indicated. "There is a huge number of configurations," says Potter. "The system allows John Trace, the head sound mixer, to instantly bring up the settings he needs, so he can concentrate on the mix of the show, which is more complex than previous *Phantom* productions."

Potter also specified an eight engine T.C. Electronic 6000 reverb system, which is used fairly extensively throughout the show. G-Type software, Mackie hard disk multitracks, and Akai samplers are used to play back sound effects.

The production features an 18-piece orchestra in the pit, outfitted with a variety of mics. "They're all double-miked with close and ambient microphones and the balance between these is changed throughout the show," say Potter. "All the strings have miniature DPAs [4061s]; the brass and woodwinds have compact DPAs [4022s], and all of them have ambient mics as well." The ambient mics include DPA 4011s, Neumann U87s, Neumann TLM 170 Rs, and DPA 4007s.

Also in the orchestra are a set of Genelec 1030a self-powered monitors, ten Aviom A-16R personal monitor mixers, and two Aviom A-16D Pro A-Net distributors, along with a Yamaha DM2000 digital monitor console.

Sound gear was supplied by two companies: Masque Sound and Specialized Audio-Visual Inc. "Masque supplied the digital console, the front-of-house, processing, radio mics, and pit infrastructure," says Potter. "SAVI did the installation of cabling, video, comms, and the loudspeaker systems. SAVI's installation staying on schedule was always going to be key to the success of the project, and it was no mean feat in difficult circumstances that they managed to do it."

Potter's brief has been to reinvent the production's sound effects and musical dynamic as needed for the different venue and production, and most of the orchestra is mixed in surround. "It's done very differently from the original," he says. This part of the job, he adds, "was great fun, working with [musical supervisor] David Caddick and Andrew Lloyd Webber in the theatre with an 18-piece orchestra and on the ProTools system. Everyone was really positive about it. Nobody ever said, 'That's not how we usually do *Phantom*.' Both Andrew and David worked closely with us throughout the production period and had lots of new ideas, which really helped.''

Indeed, the big challenge for the designer is the way the sound design moves from a big surround sound during the musical numbers to a more intimate sound in the book scenes. Lloyd Webber's score mixes numbers in his own style with parodies of operas by Meyerbeer and Mozart, among others, and the sound, in a sense, pulls focus, moving from up close and personal to symphonic, cinematic effects.

"It was really about trying to do an entirely new production of it while still honoring the original and coming up with a sound design that could live in two worlds," Potter concludes. "Right at the beginning, you go from the huge overture in surround to the *Hannibal* rehearsal [the first book scene] and there's a big change in dynamics. It's very tricky, getting in and out of the big musical moments. It's a very dynamic show, which is how Andrew likes to work. With *Bombay Dreams* [produced by Webber]. *The Woman in White,* and *Evita,* new technology is allowing us to get closer to what we really want to hear."