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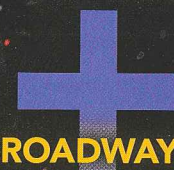
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## ATLANTIS RISING

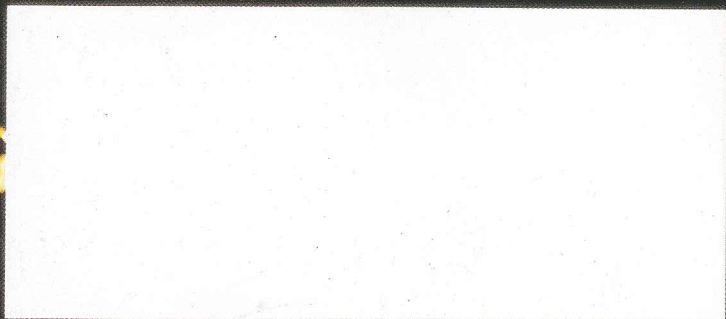
**NINETEEN  
EXTRAORDINARY  
MINUTES AT ATLANTIS,  
THE PALM**



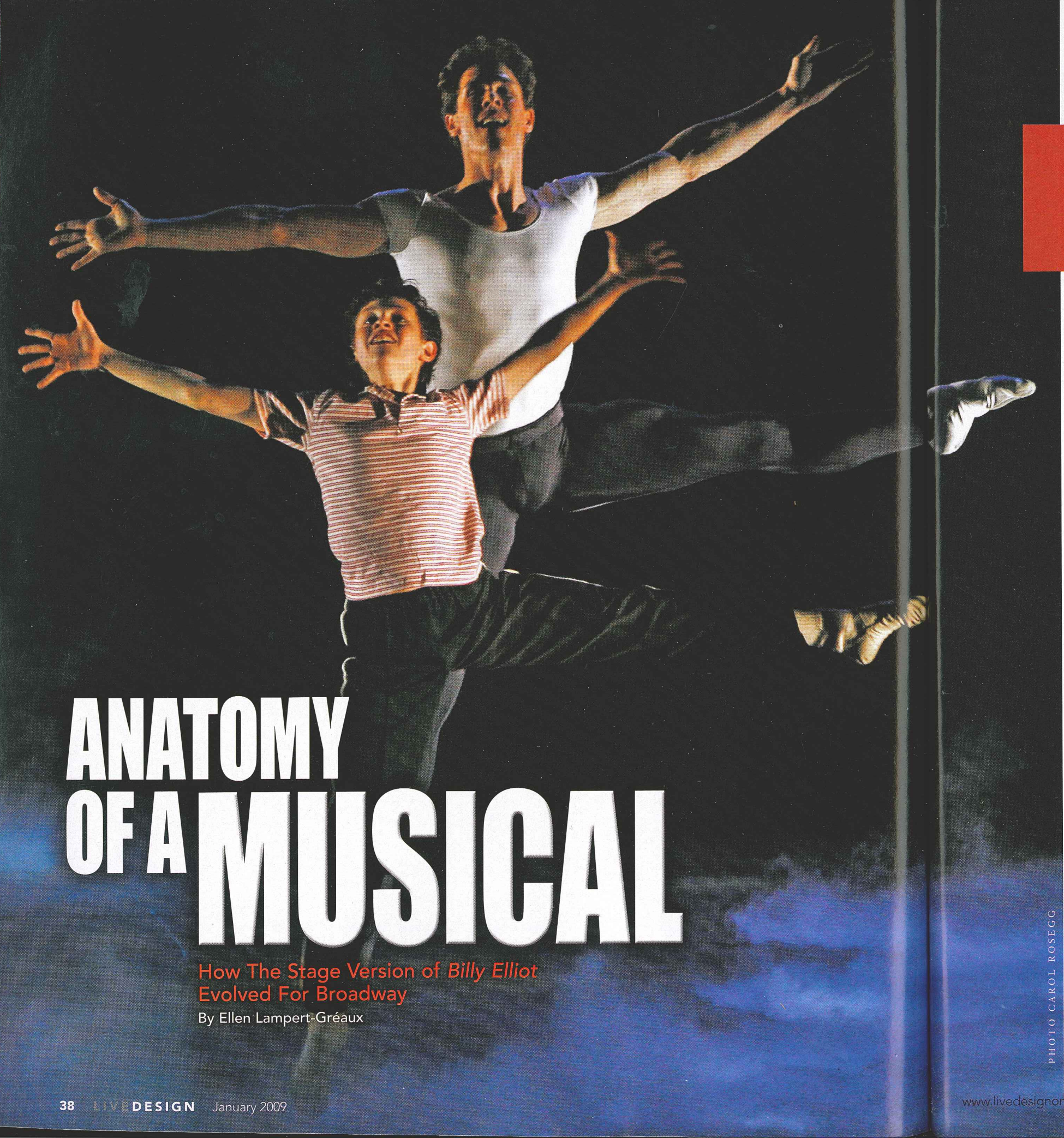
**BILLY ELLIOT COMES TO BROADWAY**

**AC/DC: BACK IN BLACK ICE**

**A SHRINE AT MGM GRAND FOXWOODS**







# ANATOMY OF A MUSICAL

How The Stage Version of *Billy Elliot*  
Evolved For Broadway

By Ellen Lampert-Gréaux



The fact that one small boy can command the stage at times in *Billy Elliot The Musical* is quite a tribute to its creative team, especially considering that sound designer Paul Arditti, lighting designer Rick Fisher, costume designer Nicky Gillibrand, and set designer

Ian MacNeil have many more operas and plays under their collective belt than musicals. But *Billy Elliot*, which premiered in London in May 2005 (*Entertainment Design*, September 2005), has taken the world by storm, with productions in Sydney and New York, where it opened in November 2008, and another which premiered in Melbourne on New Year's Eve.

Stephen Daldry, who directed the popular 2000 film version, transformed the story into a compelling stage production with music by Elton John. The story is about the miners' strike in northern England under Margaret Thatcher and one 11-year-old boy who aspires to be a ballet dancer, while his father expects him to take boxing and eventually follow his footsteps as a miner, rather than pirouette into the world of pas de deux. As the productions of *Billy Elliot* proliferate, the designers have had the chance to go back and refine their work, making this award-winning musical even better.

## STELLAR SOUND

*Billy Elliot* is Arditti's first musical design—for which he won the 2006 Olivier Award in London—and he approached it with the ear of a non-musical designer. Bright, bold, and unusually clear, yet never overpowering or too loud, the sound has been tweaked as the show moves from venue to venue.

What changes did Arditti make for Broadway's Imperial Theatre? "Obviously every theatre is different, so there will always be some changes to the system design," he says. "The first big issue in New York was that I wanted to replace the 132-input Cadac J-Type used on the London and Sydney shows with a DiGiCo D5T. This is mainly because the DiGiCo has a much smaller footprint than the J, and at the Imperial, the mixing desk position is stuck behind the back row of the orchestra, on house left, under a staircase. The area is very cramped. Luckily our amazing production mixer, Bob Biasetti, has a lot of experience with both the DiGiCo and the mix position at the Imperial, so things worked out well. This is the first big show I had done on a D5T, and I was pleasantly surprised."

Arditti's second challenge on Broadway was to accommodate a much bigger band in a much smaller orchestra pit, made even smaller by the demands of the set design, includ-

ing a big lift that pushes Billy's house up through the stage and pillars that hold up the forestage. "The original band [in London] is nine: drums, bass, guitar, two reeds, two brass, two keys," he says. "In New York, we have to use a minimum of 18 musicians, so Martin Koch, our arranger, rescored the whole show with an extra horn, two extra trumpets, two trombones, two extra reeds, and live percussion. The pit is more or less closed in, although the audience can see glimpses of the players through Plexiglas walls and slivers of space between the forestage and the front of the pit."

Having so many musicians in a small, semi-enclosed pit poses challenges for the players and the sound department. "Unlike an open pit, there is little outlet for the acoustic sound," says Arditti. "We installed a lot of acoustic treatment to absorb the sound pressure, and the musicians use headphone monitoring as far as possible. The percussion and the drums are in their own sealed rooms. It's not ideal, but we've spent a lot of time and effort making the musicians as comfortable as possible, and I'm happy with the sound they make."

A further challenge for the sound designer in the Imperial is the low level of the stage. "This means that the frontfills—Meyer UPM-1Ps—hit the first row of the audience at chest level," says Arditti. "Effectively, the frontfills are useless for row B and anywhere further back. I use the downfill from the center hang of Meyer M'elodies in the center of the orchestra to provide the main vocal coverage, whereas I would normally prefer to rely on the frontfills to pull the image down. At the sides of the orchestra, most of the vocal energy comes from two M'elodies per side on the pros, where I would have preferred the frontfills to pull the image toward center. Right at the center front of the orchestra, behind the conductor, I added a couple of Meyer MM4s on the pit rail, to fill in a vocal hole where nothing quite reaches."

Otherwise, the main components of Arditti's rig are basically the same as for the Sydney production: M'elodies for vocals on the pros and a center hang; MSL2s for band; UPM-1Ps, d&b E0s, and Meyer UPA-2Ps for delays; d&b B2 subs; Sennheiser 5012s and DPA 4061s wireless microphones; and Yamaha DME64s and Meyer Galileos to do all the matrixing, EQ, and delay.

"In particular, I was relieved to find that our experimental tap floor worked as well in New York as it did in Sydney, despite being constructed entirely in advance at the scenery shop [Hudson Scenic] rather than *in situ* as at Sydney," Arditti says. The tap floor covers most of the stage



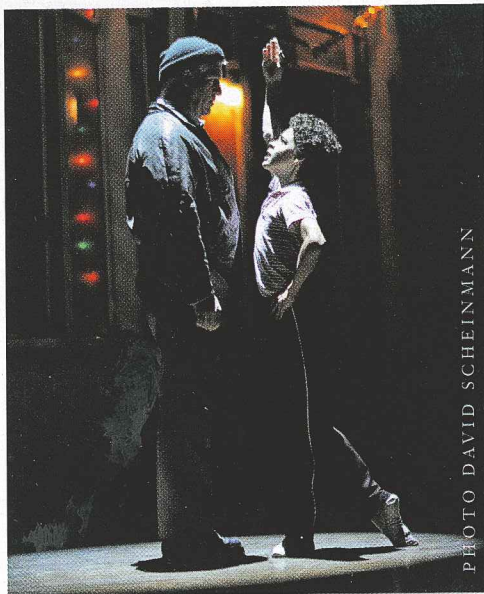


PHOTO DAVID SCHEINMANN



PHOTO DAVID SCHEINMANN

Set designer Ian MacNeil says the transfer to Broadway yielded an even more minimalist design than previous versions, calling it “more elegant and simple.”

and is made up of 96 piezo pickups built into the subfloor, connected to a Yamaha DM2000 submixer. “It has the advantage of huge gain, no interference from vocals or band, and can be localized so that only the required parts of the floor become live, leaving the rest of the floor unamplified,” he adds. “It’s tap-tastic!”

Another change in New York is that Arditti wanted to avoid using Tascam and Mackie multitrack HD playback machines, as he used in other shows. “I had been looking for a flexible software solution for some time and was hoping to use Stage Research SFX6, which will do the job I believe, but was not quite bug free at the time of the bid,” Arditti says. “So I went with SFX 5.6. While it has handled all the sound effects in the show admirably from day one, it doesn’t claim to play multiple tracks in perfect sync. As QLab is more suited to the simultaneous playback of a dozen or so tracks of audio, we swapped to two Mac Minis and QLab playback software. I have my US associate, Tony Smolenski, to thank for that idea, and our excellent sound shop, Masque, for letting me change my mind very late in the day.”

John Owens, Arditti’s UK associate, assisted in planning and executing the changes. “There’s little he doesn’t know about theatre sound, and he has a nose for great restaurants too,” Arditti says.

## BILLY, BILLY, AND BILLY

Having three boys rotate in the role of Billy adds another layer to the sound design. All three have the same basic mic system: two Sennheiser 5012s and two DPA4061s. “Each has his own personal mic rig, so that it can be color-matched to hair and skin,” says Arditti. “Wherever possible, the Billys have long hair at the front, which allows us to get the mics really low on the forehead. This is vital, as some of the boys have fairly small voices. Gain before feedback is critical in one or two places in the show, and we get fairly close to the limit.”

Arditti notes that “every Billy is coached to ensure that all the things that might come into contact with his mics while onstage—beanie hat,

a couple of dresses, several shirts, a boxing helmet, and even a handbag—don’t dislodge his mics or scrape them when they are live.” During “Angry Dance,” Billy pulls on a pair of red tracksuit pants. The pants have a third 5012 sewn in and a pair of 4061s wired down the legs, with the mic heads emerging at the feet to pick up the tap shoes. “At one point, the poor kid is wearing three packs and four mics,” says Arditti. “We’ve always had a separate mic EQ and gain setting for each boy, but the DiGiCo makes it very easy to build automatic EQ changes into the show, and these are exclusive to each Billy.”

For mic placement, there is nothing radically new in terms of techniques, according to Arditti. “As everyone acts, sings, and dances, we treat them all the same,” he says. “We try to get a good central mic position on the forehead, and where that isn’t possible, we improvise. The hair and costume departments are really helpful, and together we’ve managed to work around most of the bald heads, hats, wigs, and quick changes.”

For “Solidarity,” the use of mics is actually impossible because the choreography is based around miners and police swapping helmets over and over again. In London, some of the vocals are recorded, with the tracks created in the theatre using the wireless mics to match the sounds of the live voices. “Incidentally,” Arditti points out, “in the US, Actor’s Equity will not permit the recording of vocals on the grounds of ‘vigorous choreography.’ So if you come and see *Billy Elliot The Musical* in New York, you will see the extremely vigorous finale danced by the entire company and climaxing in the singing of a final chorus of ‘Shine’ and ‘Expressing Yourself.’ It’s all live. Suffice to say that, in London and Australia, where there are no such Equity rules, we have chosen to record these vocals!”

Bob Biasetti runs the sound console in NY, and Arditti notes, “Bob is the very best, and he makes it look easy, but I know that it isn’t. We are automating more of the band mix now with the DiGiCo, but Bob is still in ultimate control of a couple of hundred inputs, and that takes some doing. We also have two to three people backstage looking after the mics



SELECTED GEAR LIST  
FOR BROADWAY'S

# BILLY ELLIOT

PHOTO DAVID SCHEINMANN

## SOUND

### Mixers

- 1 DiGiCo D5T Surface
- 1 DiGiCo D5T-RE
- 1 DiGiCo D5Tc Control Surface
- 3 DiGiCo DiGiRack
- 17 DiGiCo Input Card
- 1 Yamaha DM1K (SFX Mix)
- 1 Yamaha DM2K (Tap Floor)
- 1 Yamaha M7CL (Band Foldback)
- 23 Aviom A-16R Rackmount Mixers

### RF

- 48 Sennheiser 1046 Receivers
- 48 Sennheiser SK5012 Transmitters
- 3 Sennheiser EK 300 IEM Receivers
- 2 Sennheiser SR 300 IEM Transmitters

### Loudspeakers

- 15 Anchor AN-1000x
- 4 d&b audiotechnik B2 Subwoofers
- 1 d&b audiotechnik ci80
- 25 d&b audiotechnik E0
- 1 d&b audiotechnik E3
- 40 EAW JF-80
- 15 Galaxy Hotspot
- 16 Genelec 8030A
- 1 JBL Control 1
- 2 Meyer Sound CQ-1
- 25 Meyer Sound M'elodie
- 6 Meyer Sound MM4
- 6 Meyer Sound MSL2
- 6 Meyer Sound UMS-1P Subwoofer
- 8 Meyer Sound UPA 2P
- 4 Meyer Sound UPJ
- 18 Meyer Sound UPM-1
- 26 Meyer Sound UPM-1P

### Processing

- 1 Apogee AD-16x A-to-D Convertor
- 5 Apogee DA-16x D-to-A Convertor
- 5 Lexicon PCM 91
- 2 Meyer Sound Galileo 616
- 2 TC Electronic M3000

- 3 XTA DP 324 SIDD
- 4 Yamaha DME 64

### Microphones

- 72 DPA 4061
- 5 DPA 4011
- 3 DPA 4022
- 1 Sennheiser E602 II
- 5 Sennheiser E604
- 5 Sennheiser MKH-40
- 5 Shure SM58
- 6 AKG C414 B-XLS
- 1 Audix D6
- 3 Beyer M201
- 2 BSS AR133 DI
- 13 Neumann KM184
- 4 Neumann U87
- 1 Radial JD6 6ch DI
- 2 Radial JDI Duplex Stereo DI
- 1 Radial JPC DI
- 116 Piezo Transducer Pickups

### Amplifiers

- 10 d&b audiotechnik D12c
- 17 Lab Gruppen FP2400Q
- 7 Lab Gruppen FP3400

### Software/Computers

- 2 QLab Software on Mac Mini
- 2 Stage Research SFX 5.6 Software on PC
- 3 Additional PCs for Cue Editor, Mics, and System Control
- 1 Tablet PC

### LIGHTING

- 3 Strand 500i-Series Console
- 4 Strand SN110 Nodes
- 4 ETC Sensor+ 96x2.4kW Advanced Feature Touring Rack
- 50 ETC Source Four Revolution with Wybron Coloram II Scroller
- 18 Vari-Lite VL1000AS
- 15 Vari-Lite VL3500Q Spot
- 6 Vari-Lite VL3000Q Wash
- 16 Martin Professional MAC TW1

- 4 Martin Professional MAC 700 Wash
- 2 DHA Digital Light Curtains
- 6 ETC Source Four 14° Ellipsoidal
- 55 ETC Source Four 19° Ellipsoidal
- 6 ETC Source Four 26° Ellipsoidal
- 19 ETC Source Four 36° Ellipsoidal
- 9 ETC Source Four MFL PAR
- 24 ETC Source Four NSP PAR
- 4 Selecon Pacific 45°-75° Zoom spot MSR-HR
- 7 Selecon HUI Flood with Barndoors
- 8 Strand Cantata PC
- 3 Strand Pattern 23
- 1 Strand Pattern 123
- 7 Strand Pirouette
- 6 Selecon Ardiis Aureol BeamSpot
- 4 L&E MR16 Mini-Strip
- 1 L&E 1kW Runt One-cell Cyc Light
- 16 L&E 6350 Mini-Floods with Barn Doors
- 2 Lycian 1290 XLT 2Kw Xenon Followspot
- 26 Wybron Coloram II 4" Color Scrollers
- 4 Wybron Coloram II 7.5" Color Scrollers
- 7 Wybron Coloram II IT Color Scrollers
- 5 Wybron Coloram II 24-Way Scroller Power Supplies Unit
- 4 Selecon Internal Dowzers
- 8 City Theatrical/White Light DMX Snow Machine
- 1 Jem TechnoFog
- 2 Look Solutions Unique Hazer
- 2 Look Solutions Power-Tiny Smoke Machine
- 4 Le Maitre LSG PFI-9D Low Smoke Generators System
- 4 Le Maitre Fog Floor Pocket
- 1 Viper Fogger
- 1 MDG Atmosphere Hazer
- 2 MDG Max 3000
- 3 Jem Fans
- 4 Motion Labs 48-Way 208V Six-Circuit Veam Distro
- 2 Motion Labs 48-Way 110V Six-Circuit Veam Distro
- 1 Motion Labs 24-Way Cue Light System
- 1 City Theatrical Six-Way Work Light Switch Panel
- 1 Focus Track Software

### PROJECTION

- 2 Panasonic PTD5700U 6,000-Lumen Projector
- 1 QLab Video System With Radeon X1300 Video Card
- 1 Doug Fleenor DMX-to-MIDI Interface
- 1 Magenta Research Multiview Matrix 8x8 Cat5 Video Matrix Switch
- 1 Rosco Keystroke

### VENDORS

- Lighting:** PRG Lighting
- Sound:** Masque Sound
- Video:** Sound Associates
- Pyro:** Ghost Light FX
- Sets:** Hudson Scenic



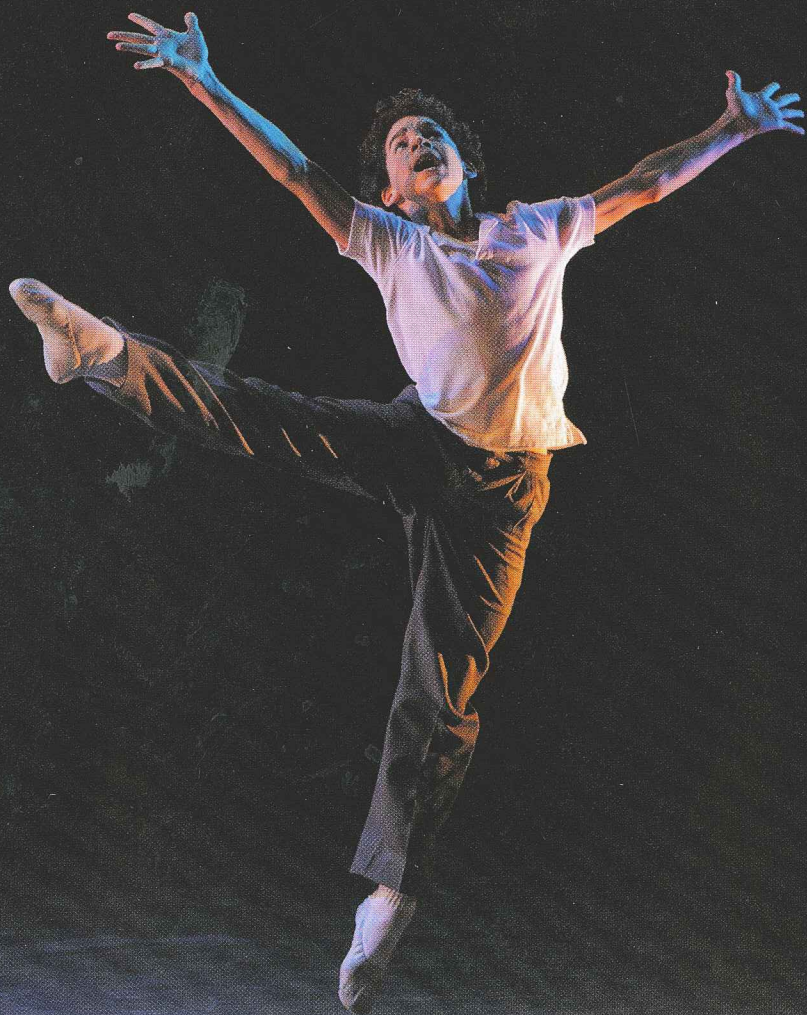


PHOTO DAVID SCHEINMANN

Paul Arditti's design includes a mix of speakers from Meyer, d&b audiotechnik, EAW, Galaxy, and Genelec, with main sound run on a DiGiCo D5T console.

and keeping an eye on all the automated stuff.”

The Melbourne version is essentially a transfer of the Sydney show as far as the sound is concerned. “We don’t have the luxury of the three months of tech and previews in Melbourne that we had in London, Sydney, and New York,” says Arditti. “I’ve added a few more speakers since Sydney because Her Majesty’s Theatre in Melbourne has an extra auditorium level. I’ve also added a ring of delays in the orchestra because it’s acoustically very tricky under the mezzanine overhang. Apart from that, it’s all about tuning the system for the new theatre. The rest is down to production mixer Dave Tonion and the Australian sound team.”

The extreme clarity of the sound was one of Arditti’s primary goals, especially to deliver the words as clearly as possible to a New York audience that is not as tuned to the Geordie accent as its London counterpart. “I have done everything in my power to make those words come across clearly,” he says. “I guess it’s achieved by equipment selection initially and choosing to separate the band and vocal systems. The rest is EQ, delay, and level. There’s no compression on the vocals and virtually none on the

band. We experimented a great deal through the long preview period with how loud the show should be. It has now found its level. I gave many notes regarding audibility and intelligibility to the Billys and other kids to get the maximum clarity from the performers themselves.”

Arditti says that the show was never intended to sound acoustic. “We’re not doing a stadium opera, which requires amplification, but would prefer it to be undetectable,” he says. “The sound design is one of the many facets of the show that we unashamedly present to the audience. It is the only way to marry the small voices of the children with the big sound of the band. The sound system needs to be able to pack a punch in the big numbers and drop down to near-acoustic levels for the small domestic scenes. There’s a big dynamic range, which I always think is far more exciting than loud all the time.”

## THE MACNEIL/FISHER REPORT

MacNeil and Fisher also adapted the scenic and lighting concepts, respectively, as the show evolved on the road to Broadway. MacNeil’s basic concept is modified minimalism, which became even simpler, yet more effective, in certain scenes. One example is the poignant scene in which Billy’s father decides to cross the picket line of striking miners and return to work. In the New York version, a series of gates at the entrance to the mine sweep around the stage, opening to allow the working miners to enter and then becoming a barrier to keep the striking miners out. Another example is the dance section at the end of Act I when the men create a barricade. “It’s as if they ripped apart a giant billboard,” says MacNeil. “This adds another layer and element of surprise, when the billboard falls away to reveal the police with riot shields and one small boy pressed up against them.”

Perhaps the biggest scenic change for Broadway is when Billy goes to audition for the Royal Ballet School. “We redesigned it, and the story was slightly edited,” MacNeil says. “It is now a simpler way to tell the story.” The new scenic piece, as seen in the New York version, is a large wall that represents a corridor outside of the room where Billy auditions. “The visual language here is very different from where we have spent the rest of the show, which is grittier. This scene is the physical realization of the opera house, which is very European and slightly decayed. I think these things are more beautiful with a patina. Billy finds himself in an aristocratic world that others take for granted. It’s a Jo Mielziner kind of moment,” says MacNeil, referring to the man he considers “the greatest designer of musicals of all time.”

This is one of the scenes that is different in the three versions of the show to date—London, Australia, and New York. “In London, we have a side view of the stage with some wings and a cross-section of a proscenium, and we see Billy’s failed audition for the school,” says Fisher. “This is a pretty big flown piece with some additional flats to make it look like they are using the stage after a rather old-fashioned ballet was performed. The lighting tries to reflect the idea that the audience is viewing the scene from the wings.”

In New York, there is an upstage crossover corridor through which the audience can see Billy doing some of his audition facing upstage toward a



# "Taking a musical to Broadway is not to be taken lightly."

—Ian MacNeil

scaled scenic piece of a theatre auditorium. "This piece has a number of internal lights to give the effect of house light fixtures and unseen under-balcony lighting as well as the old-fashioned footlights that were still in place in the Royal Opera House in the 1980s," says Fisher. "I think they are still there to this day, as some of the older rep pieces depend on them. Billy now performs some audition exercises, and the real audience is seeing him from an upstage perspective, so Billy is lit from what would be the front-of-house. He then leaves the stage and comes through the door in the corridor scenic piece where he confronts the other auditioning boy who he eventually hits...So effectively we are swinging the audience's perspective 180°, and the theatre audience is now in the auditorium. Lighting-wise, in the London and New York versions, I try to contain the stage space in lighting that is appropriate to the scenery."

In Sydney, the audition scene was cut. "Instead, we see a rehearsal room, and the confrontation between the two auditioning boys happens here so the lighting reflects a brightly lit rehearsal studio," says Fisher, who received the 2008 Helpmann Award for Best Lighting Design for the Australian production.

For the New York show, Fisher uses two ETC Revolutions—there

are a total of 50 in the show—in a front-of-house position to replace two Strand Pirouettes, which are in the former rigs. "There is still a bar of Pirouettes that comes in as a scenic element," he notes, pointing out that the remainder of the automated rig is concealed, so as not to be anachronistic (the show is set in the 1980s). Projection gear added in New York includes two Panasonic PTD5700U 6,000-lumen projectors perched on the balcony rail and used with QLab software on an Apple computer system and a Rosco Keystroke interface for informational period footage at the top of the show and additional images on the billboards in the "Angry Dance" scene. Pyro gear was supplied by Ghost Light FX.

The lighting crew on Broadway includes UK associate LD/US programmer Victoria "Vic" Smerdon, US associate Daniel Walker, assistant Kristina Kloss, and production electrician Jimmy Maloney, Jr. and head electrician/board op Kevin Barry. The entire show is run on a Strand 500i console, with eight universes of DMX.

Having collaborated with Fisher on such productions as *Via Dolorosa* and the award-winning *An Inspector Calls*, MacNeil notes, "The collaboration speaks for itself." He also gives props to Gillibrand for her costume designs. "She has such a visual chutzpah," he says. "It gives you courage in terms of color, and not everything put on stage has to be beautiful. We want the audience to believe in the locations and not pretty them up too much. When a big musical is being pulled together in a rehearsal room, it's hard to be really coherent. It's great to have another go at it. The Broadway audience has the best of it—more elegant and simple. Taking a musical to Broadway is not to be taken lightly." **LD**

Rick Fisher's lighting rig is run via a Strand 500i console and includes gear from Vari-Lite, Martin Professional, Clay Paky, ETC, and Selecon.

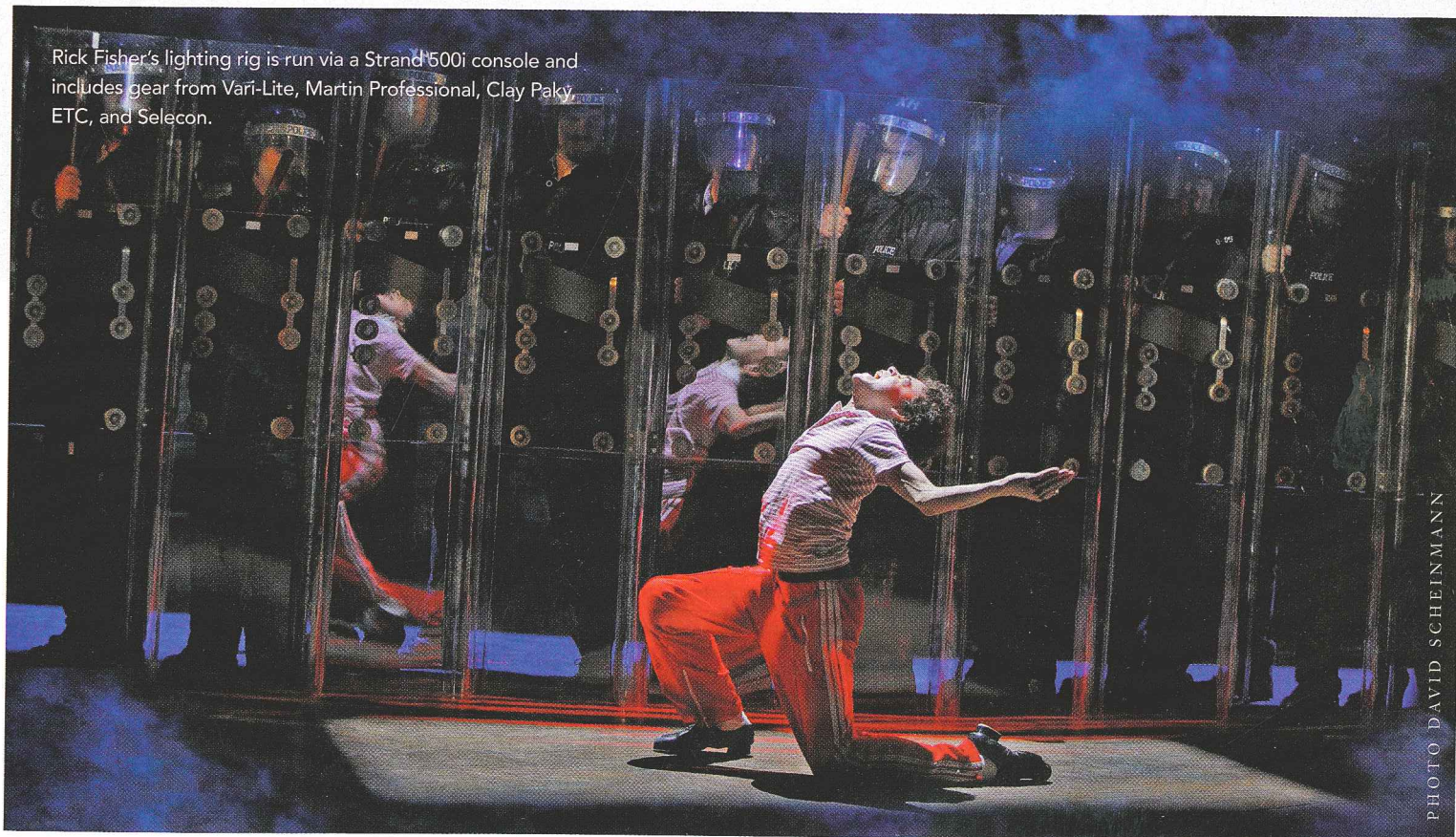


PHOTO DAVID SCHEINMANN