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There is much of interest in director Danny Boyle's production of *Frankenstein* at the National Theatre, not least an aerial forest of incandescent light bulbs and a sound system from a manufacturer whose name you may not immediately associate with theatre. [Rob Halliday](#) and [Phil Ward](#) bring the story to life for LSi . . .

Photo: Catherine Ashmore

Frankenstein

Lighting, by Rob Halliday

The sense of excitement around the National Theatre's new stage adaptation of Frankenstein has been palpable. Whether because of superstar director Danny Boyle (*Trainspotting*, the Oscar-winning *Slumdog Millionaire*) returning briefly to the theatre before staging the opening of the 2012 Olympics, the casting of Benedict Cumberbatch and Jonny Lee Miller alternating the principal roles of Professor Frankenstein and his creature, or the show playing a continuous run rather than being part of the National's more usual rolling rep, tickets were a hot item before the show even opened.

Fortunately, it delivers on that excitement even as the audience first walk into the Olivier's auditorium: an enormous, curved cyclorama wraps around the rear of the stage, lit a glowing red; the auditorium's familiar concrete walls are dressed in fabric (500sq.m of ShowTex UK's Alushape molding cloth is used to line the walls of the theatre leading up to the stage); what appears to be a giant drum glows in the centre of the stage; an ancient bell hangs above the central rope dangling tempting audience members to pull on it (the first to give in to that temptation quickly encouraging others to follow). And above all of that hovers a giant triangular wedge, chock-full of the biggest assortment of light-bulbs you've ever seen. Once the show starts the drum is revealed to be a womb from which the creature bursts, and over a 90-minute, interval-free journey we then follow his life, learning to walk, to talk, to feel fear and pain, and coming face to face with his creator.

Guiding us on that journey - and responsible for that incredible wedge of lightbulbs - is lighting designer Bruno Poet, more commonly found in the opera houses of Europe but forging quite a reputation for himself at the National after his acclaimed design for *Every Good Boy Deserves Favour* in the same auditorium in 2009. It was that show, which presented a similar challenge in requiring lighting to control the audiences' attention on the theatre's big open stage, that led the National to suggest Danny Boyle meet with him. "We talked over coffee, and just got on," Poet recalls of the first meeting. "We talked a lot about the big black void that is the Olivier stage and how strongly directional sources can really focus that huge space. Danny is fantastically receptive to ideas, yet very clear about what is right for the production. He and designer Mark Tildesley have an infectious enthusiasm that makes everyone involved want to push the boundaries to fulfill their ambitions."

The lightbulbs developed in this way. "Danny and Mark conceived a ceiling of bulbs to represent the forces of electricity harnessed by Frankenstein, and to provide

a dazzling light for the moment the creature is born and opens his eyes for the first time. There was much debate about whether to use real bulbs or LEDs in capsules. Danny had been talking to LED people about the Olympics and was very excited about the flexibility they would give in terms of colour, but I was very keen to use tungsten, both for its warmth and because it better suggested the industrial age, the time period of the show. The National mocked up part of the ceiling, and the moment everyone saw it, saw that magical glow of a tungsten filament at a really low level, they were won over."

The final creation could be a work of art in its own right. It's a mirrored, triangular form from which are suspended just over 3100 light bulbs of more types than you've ever imagined - some with lampshade hats, some with protective cages, some raw and exposed. Though rejecting LEDs, Poet wanted to control the bulbs as an LED array would be controlled, allowing organic patterns and movement to be run across it, rather than being limited to manually constructed chases or flashes. Using LEDs, this is possible with individual control of each LED 'pixel' - but it is harder to achieve with tungsten bulbs requiring dimmers.

"My dream was to have individual control of each bulb; we researched various ways of achieving this, but it was looking unaffordable. I called Dave Isherwood at White Light for advice, and he was brilliant - he found a very low-cost 12-way dimmer rack from NJD which would let us afford 1000 dimmers. So we divided the surface of the ceiling into 1000 equally sized 'pixels' and paired together whichever bulbs hung within each pixel. I realised that I had created a monster of wiring, cabling, patching and control; I was staggered by everyone's enthusiasm to make it work!"

The result was a collaboration between Scott Fleary Productions (who constructed and wired the ceiling), White Light (who supplied and wired the dimmers), Historic Lighting (who supplied the woven fabric cable and many of the light bulbs), Allelectrics (provider of more lightbulbs), and the National Theatre's staff, led by Marc Williams, Paul McLeish and production managers Sacha Milroy and Richard Eustace, who between them built, installed, wired and rigged the structure.

Poet then worked with lighting programmer John McGarrigle to bring it to life, using the new pixelmapper functionality built into the theatre's ETC Eos lighting console to run artwork across the array. "That worked incredibly well, letting us try out an enormous range of effects very quickly," Poet notes. "I think we were the first people to use the Eos in this way, and ETC were hugely supportive."

As predicted by the designer, even in this age of omnipresent video and LED arrays, the result is dynamic, visceral



Photo: Bruno Poet

and thrilling, largely because of the tungsten sources: waves of heat accompany the waves of light and at full intensity it is eye-popping. But then at low level there is the completely different magic of seeing three thousand filaments glow; when off, Poet uses it as a receiving, rather than emitting, surface, sculpting and texturing it with light.

While using more dimmers here than have ever been seen in the Olivier, the rest of Bruno Poet's rig is remarkably sparse: since he doesn't have to share the rig with any other shows (and since the theatre's usual side positions have been wiped out by the 'wrapping' of the auditorium), he has just what he needs rather than the theatre's usual comprehensive rep rig. "When I first saw the set model, it was quite clear to me how I wanted to light each scene", he explains - for one scene this not using any theatrical lighting, relying entirely on a real gas flame. For the rest, he relies largely on tungsten sources ranging from birdies to VL5B, VL1000 and TW1 moving lights to 1k beamlight and converted 10° Source Four followspots (always used soft, never feeling like people are 'spotlit') and up to 5k Fresnels and a series of 2k PCs way up high stage right and spotted right down to give beautiful shafts of sunlight. Arc sources are then used to cut through this, "VL500 Arcs creating dramatic fingers of cold backlight, VL1000AS used to shutter specifically to parts of the set," the NT's moving light stock supplemented by PRG. A set of LED uplighters, supplied by Surelight, mounted in the floor tone the wrap-around cyc during the start of the show, and a line of DHA Digital Light Curtains charge the air with light when required. Poet's favourite light, the Svoboda batten, also makes an appearance, providing a dramatic final exit for the show's two principals. Sadly, some ideas didn't quite make it: a 'pod' of VL5s stage left was meant to track around the action to give shifting sunlight and a passing of 'virtual' time, but lack of real time to solve problems with the track means it now forms a single, fixed source from stage left.

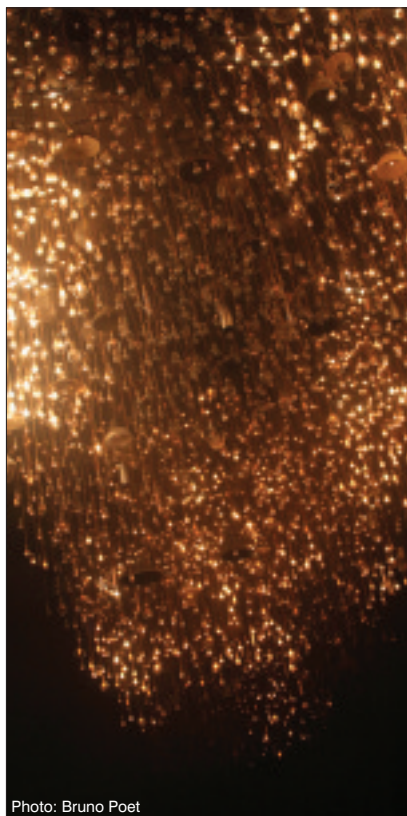


Photo: Bruno Poet



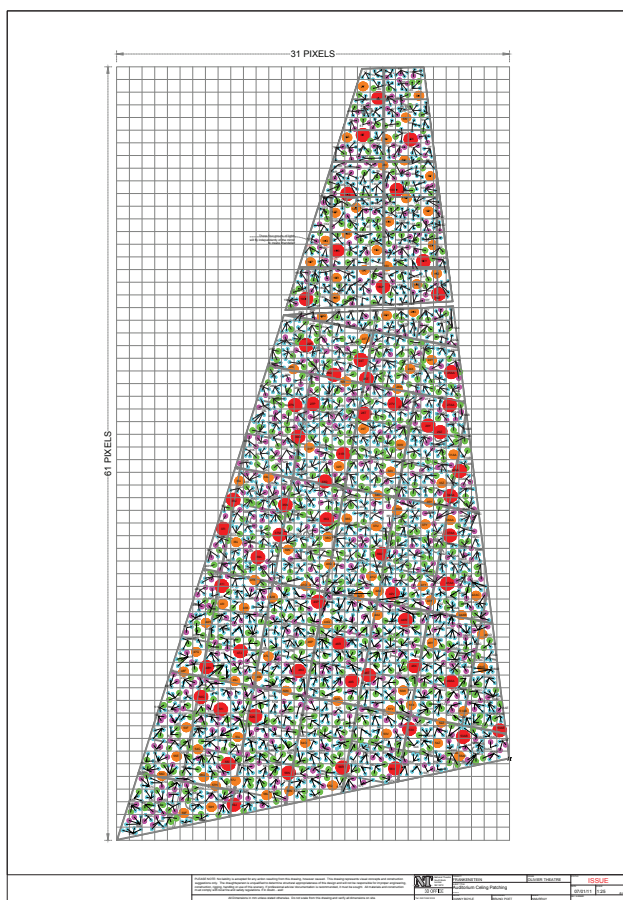
Photo: Bruno Poet

Stylistically, Poet's lighting follows the stylistic shifts of the show, from the expressionistic opening to the dramatic first reveal featuring the appearance of a steam train (internally lit using a classic old Strand Pageant) and on to the heightened realism of the rooms and Scottish retreat seen later in the show. What is triumphant about the lighting is the way that it manages to retain the huge, open feel that the set design creates in the Olivier while at the same time ensuring that the audience's attention stays completely focused where it should be. It is a marriage of theatrical and operatic that is quite beautifully done, the perfect contribution to a thrilling - and now completely sold out - evening of theatre. Though those without tickets can still catch the show in cinemas when the NT broadcasts it around the world as part of its acclaimed NT Live project . . .

Audio, by Phil Ward

The National Theatre is very confusing. From the outside, in its stupendous plot on the South Bank of the River Thames, it looks like some of the kids who skateboard the neighbourhood have embedded giant, square frisbees into a concrete lift shaft. Inside, on the other hand, it looks like some of the kids who skateboard the neighbourhood have embedded giant, square frisbees into a concrete lift shaft. The effect is as disorientating as bursting into unnatural consciousness with the realisation that your body has been stitched together from other dead people - an event that opens this stage adaptation of 19th Century horror template *Frankenstein*.

With a stellar cast and subtle, ambient effects composed by uber-cool techno doyens Underworld, this production couldn't go wrong. It was Underworld's Rick Smith who decided that his sound effects needed a little more acoustic help than was usual.



Now with some 20 years of touring the world's biggest festivals behind them, Underworld have enjoyed the sonic ministrations of FOH engineer John Newsham for a long time, and have increasingly benefitted from the trust they place in UK-based point-source mainstays Funktion-One. As soon as these loudspeakers were road-tested inside the remarkably lateral Olivier Theatre, it was just like the moment when Frankenstein's creation hears a musical instrument for the first time. But with less grunting.

Together with Newsham, the team - Matt Berry, full-time sound operator at the National Theatre; Ed Ferguson, head of sound at the Olivier; and Ed Clarke, freelance co-sound designer and Underworld confidante - set about using the width of the theatre to do special

Above, Left: The wiring diagram for Bruno Poet's light bulb feature (by Emma Pile, NT Digital Drawing & Design Office);

From Top: Lighting designer Bruno Poet at work;

The Sound team: Ed Ferguson, Matt Berry, Ed Clarke and John Newsham; Rick Smith of Underworld.



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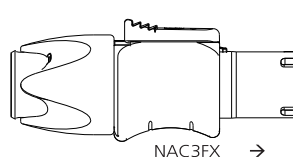
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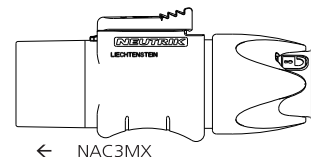
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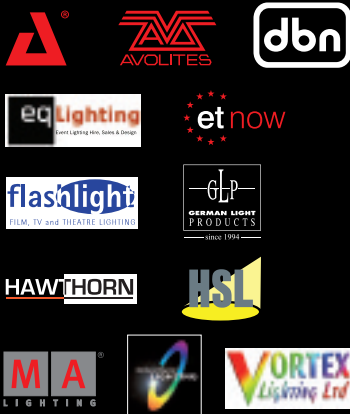
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Photo: Catherine Ashmore

things with stereo using three systems: one for music and sound effects, one for speech and another for rear effects.

The music system has two very wide left and right clusters of six mid/high Resolution 3s per side - three for the stalls and three for the balcony. "This was so that, wherever you are in the house, you're basically looking down a horn," says Newsham. "Even if you're way over at house left, you're still looking down a horn at house right. The room is extremely wide, but if you pan things really hard you do hear a lot of movement in stereo."

The left and right span is repeated by the subs, which are F221s. Quite a way upstage, more sub is provided by two Res 4s per side, four F218s and four IB-218s with double infra-horns. "That's where the really deep sub comes from," explains Newsham. "The long throw gives you a real sense of distance with some of the effects. Rick said that he wanted really dynamic, stereo reproduction of the music parts and the sound effects, plus a different dimension: some real depth using the length of the stage. He was also very keen to do something with the voice system."

The vocal system consists of three of the same Res 3 pairs, upper and lower left, centre and right, across the proscenium. "I also felt the front-fill needed to be stronger," continues Newsham, "so that the proscenium coverage angle didn't have to be so great. That way, the delays could be a lot more consistent. We ended up using 10 F-55s let into the front edge of the stage."

Ed Clarke set up the vocal delays using XTA AudioCore processing, establishing several zones on stage with outputs to match the movements of the actors. Further speaker management came courtesy of the X04, the new 4-in, 8-out audio management developed by XTA in conjunction with Funktion One. "Ed did a great job," says Newsham. "You're

simply not aware of the speakers, nor that the actors are mic'd up at all - even at some high SPLs. This is where the pattern control of the Res 3s really came into its own. You can't set up delays with a 90°x90° box - it's too wide. It might be in time in the middle but it certainly won't be at 45° off-axis. With a maximum of about 60° horizontal, and maybe 25° vertical, you can get delays that work really convincingly."

Initially the actors resisted microphones - this is, after all, the National, home of classical theatre. "But it's such a wide room," Newsham points out, "that there are real issues unless you're projecting forwards directly at the audience. As soon as the actors project to house left, they have, effectively, got their backs to house right. That's why we designed the system around the Resolution 3, which has such focused pattern control."

Lots of customising went into the brackets and yokes in order to dovetail the left and right systems into the set while maintaining point source integrity. Further restrictions were created by the extraordinary lighting fixture flown low above the stage, so in general this was a case of making the most of a very hi-Q box in an awkward space - not necessarily small, but beset with compromises.

A rope dangles onto a central aisle in the stalls. At the end of it is a half-ton bell, re-made from a 400-year old cast by the Whitechapel Bell Foundry, chosen by Rick Smith and mic'd up. Nobody draws any attention to it but, as the audience files out replete with catharsis, if it occurs to anyone to pull on the rope they can. Sometimes they do, sometimes they don't. But the tone is unforgettable: a doom-laden toll to round off an evening of torturous angst. Hammer Film Productions would be proud.

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