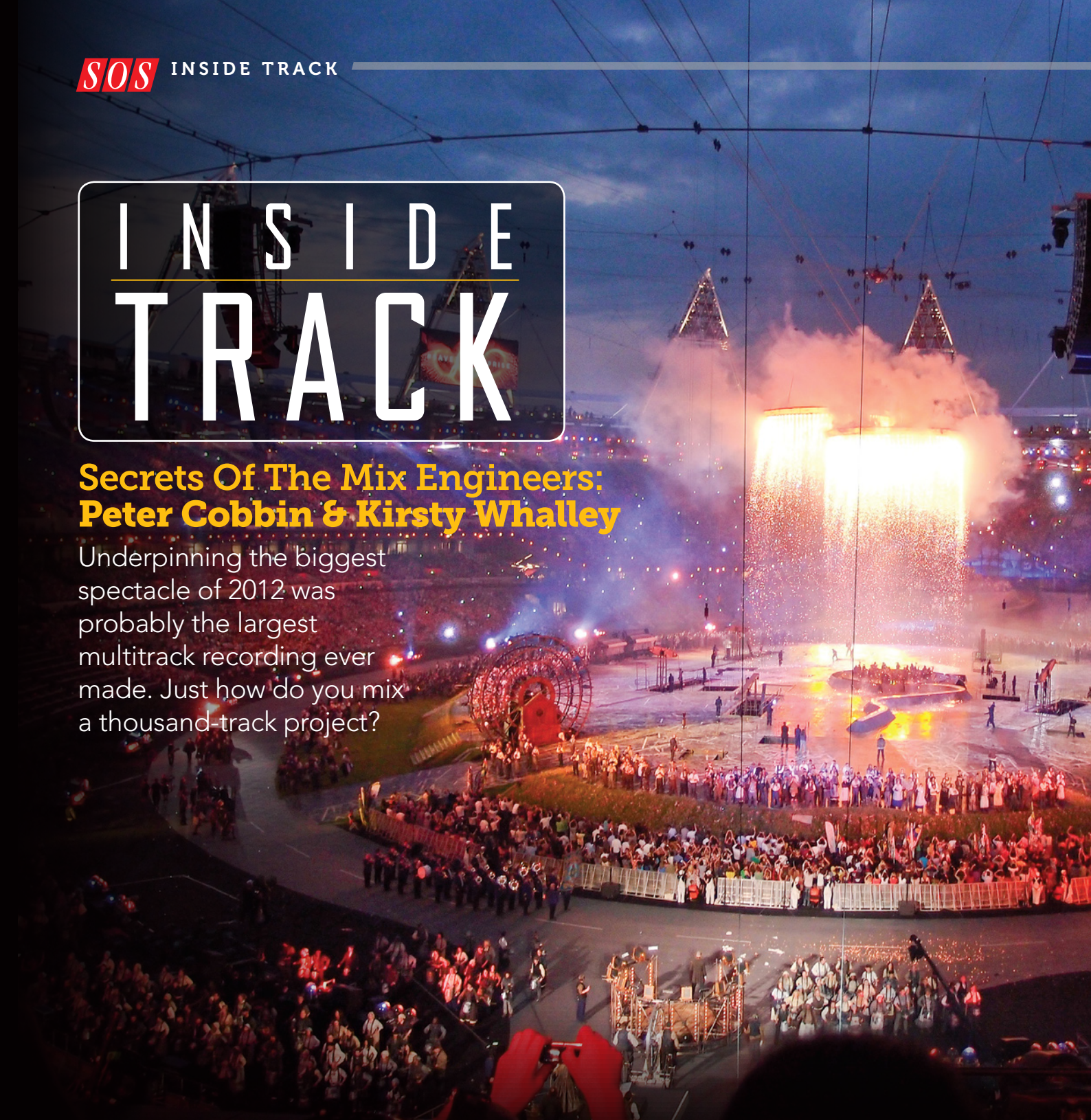

INSIDE TRACK

Secrets Of The Mix Engineers: Peter Cobbin & Kirsty Whalley

Underpinning the biggest spectacle of 2012 was probably the largest multitrack recording ever made. Just how do you mix a thousand-track project?

PAUL TINGEN

On July 27th 2012, 85,000 people in the stadium were joined by four billion television viewers for the Opening Ceremony of the London Olympic Games. Perhaps the most memorable section of this unique event was that called Pandemonium, which saw 2500 volunteers recreate the Industrial Revolution, complete with 30-metre-high belching chimney stacks. It culminated in the forging of five enormous floating rings, forming an Olympic logo which was then carried 34km into the sky by balloons.

The enormous scale of the ceremony has been illustrated in the press with many mind-bending statistics, such as a staging area of 15,000 square metres, a 23-ton Olympic bell, a stadium flying system that could carry 25 tonnes, a mile of costume railing, 7500 on-stage volunteers and a whopping 284 rehearsals. On a more technical level, flyers and press releases also boasted of the million-Watt PA system, with 500 speakers, and 317km of cabling. The music, too, was forged on an epic scale, and never more so than in the case of 'And I Will Kiss', the track against which Pandemonium unfolded.

Here, too, the statistics are mind-boggling: 1200 musicians were recorded in dozens of sessions, yielding two dozen Pro Tools projects containing several thousand tracks in total. Three months' work on a 1000-channel desk was needed to condense all this material into a 200+ track mix session, and then to several different stereo and 5.1 mixes. All just to create one 17-minute piece of music. If there was a *Guinness Book Of Records* entry for World's Largest

'And I Will Kiss' was the musical backdrop to the Pandemonium section of the ceremony, charting the impact of the Industrial Revolution.

Kirsty Whalley and Peter Cobbin in the Penthouse Studio at Abbey Road, where 'And I Will Kiss' was mostly mixed.

Photo: Peter Cobbin

Recording Session, 'And I Will Kiss' would win hands down.

The emphasis on music was the work of director Danny Boyle, Artistic Director of the 2012 Olympic Opening Ceremony, also titled *Isles Of Wonder*. He asked long-term collaborator Rick Smith of Underworld to act as Music Director, and Smith in turn enlisted Pete Cobbin, Kirsty Whalley and Allan Jenkins as Associate Music Directors. Cobbin and Whalley also mixed most of the music for the first half of the event (before the athletes' parade), which appeared on CD1 of the *Isles Of Wonder* double album. A wealth of top-flight artists were involved in this section, including Paul McCartney, the Arctic Monkeys, Mike Oldfield, Emeli Sandé, Dame Evelyn Glennie and Dizzee Rascal, but pride of place went to Rick Smith, who wrote the epic 'And I Will Kiss' as well as 'Caliban's Dream', the track performed while the Olympic cauldron was lit. Both titles are references to Shakespeare's *The Tempest*.

Too Much Pressure

Both Cobbin and Whalley work full-time at Abbey Road Studios. Whalley, a former Guildford University Tonmeister graduate, is a freelancer, while Cobbin, an Australian engineer/producer who moved to the UK in 1995, is the studio's Director of Engineering. Whalley and Cobbin have been involved in plenty of gargantuan, high-profile projects, including mixing the soundtracks of several *Harry Potter* and *Shrek* movies and of Ridley Scott's *Prometheus*, but the scale of the *Isles Of Wonder* project left even these two dyed-in-the-wool professionals gasping for breath. "We were slightly overwhelmed at times," said Cobbin. "The pressure was enormous. I'm starting to feel tired again even talking about it!"

'And I Will Kiss' started out as a demo that Smith had created in Logic in the Underworld studio, featuring synths and programmed drums and his Underworld partner Karl Hyde on vocals, guitar and bass. Whalley and Cobbin first heard this demo in late 2011 or early 2012, and their first recording session for the track took place in March. From April until July 27th they worked full-time on the *Isles Of Wonder* project, with most of their efforts going into 'And I Will Kiss'.

With the help of several engineers, including Lewis Jones as Pro Tools recordist, Whalley and Cobbin set about adding to, and replacing elements of, Smith's demo. To this end they produced four recording sessions in Abbey Road Studio 1, one with the 116-piece London Symphony Orchestra On Track, one consisting of four recording blocks (as per Musicians Union regulations) with Dame Evelyn Glennie, one with violinist Sonia Slaney, and 12 recording blocks with a handful of professional percussionists headed by Paul Clarvis and Ralph Salmins. Another four sessions took place in Abbey Road Studio 2, with the 28-piece Grimethorpe Colliery Band brass ensemble, a 20-piece choir, eight male vocalists, and a 40-piece steel band called Nostalgia. There were also several on-location recording sessions at 3 Mills Studios, in a rehearsal place in Dagenham, and in the Olympic Stadium itself, with the 965 drummers who performed on the night — most of them volunteers.

'And I Will Kiss' was the ultimate kitchen-sink production. During the production period the structure of the musical piece constantly changed in response to demands from the theatrical production, which was to involve what Boyle memorably and aptly called the "biggest scene change in theatre history".

Cobbin begins the story: "The Opening Ceremony was divided into a cultural section and a section that we called Protocol, which contained all the must-do events that the Olympic

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'And I Will Kiss' was the musical brainchild of Underworld's Rick Smith.

Photo: Peter Cobbin

» Broadcasting Service took control of: the athletes' parade, the flag bearers, the national anthems, and so on. LOCOG [*The London Organising Committee of the Olympic and Paralympic Games*] had a free hand for the cultural section, which was an opportunity for Britain to make a statement about itself. Danny Boyle came up with many of the ideas for this, and for us the Industrial Revolution section, and with that 'And I Will Kiss' was the most significant item. The idea was not only to symbolise the transformation of Britain into an industrial nation, but also to show the social changes our society underwent during that time. The set and the scale of everything was so large, with none of us knowing, for example, how long it would take to transform a stadium full of grass into chimney stacks and water mills and so on, that Rick and Underworld had the big challenge of coming up with something that was flexible and could be adjusted as needed. We needed a piece of music that could be rehearsed to, with 1000 marching people, that could be extended or shortened as needed and that had space for what we called the Poppy section, a quiet section in the middle during which the fallen in the wars were remembered.

"The map that Rick had come up with turned out to be excellent, and his basic mix of his track was pretty good and representative of the final result. Rick's demo was a techno-based track, and in discussions with Danny, ideas emerged of certain live elements that could be added, like the string orchestra, the steel band, the Grimethorpe Colliery Band, the professional drummers [*Paul Clarvis, Mike Dolbear, John Randall, Frank Ricotti, Ralph Salmins, Corrina Silvester and Ian Thomas*], the thousand volunteer drummers, the singers, and Dame Evelyn Glennie. Of course, the music had to reflect this cast. So while the theatrical mass movements and choreography were being rehearsed, we began to add all these other musical elements. It was a massive undertaking. And so what started as predominantly an electronic track ended up as something that still had its techno origins, but also grit and edginess and a feeling of epic human energy and acoustic space."

Hit The Bucket

As part of the process of making the music "reflect the cast", Smith and main percussionist Paul Clarvis worked together on some of the drum arrangements, and were involved in training and recording the 965 volunteers, who all played upside-down buckets. Whalley explains: "In Abbey Road Studio 1 we recorded Paul and the handful of professional percussionists playing several drums throughout the whole track, like kick drums, small and large taikos, snare drums, cymbals, oil cans, djembes, and other things. We also tracked them playing many layers of the various metal and plastic buckets that were used by the live volunteers on the night. There were probably 20 or so different kinds of percussion, each recorded a few times, so just that one recording session added up to a Pro Tools session of more than 400 tracks! We recorded in Studio 1 because we »

» wanted a large sound. The room is great for recording a symphony orchestra, but becomes even more alive when you have just a few players in there, because there is less absorption.

"During the project the various members of the music team (including Rick's assistant Kris Burton) recorded a large number of the rehearsals with the volunteer drummers at the old Ford factory car park in Dagenham, 3 Mills Studios and the stadium, with fully separate, handheld Nagra recorders. Because the drummers moved around a lot, we couldn't predict where the best place would be to place a fixed recording system. During these rehearsals and also during the final performance the drummers all had individual in-ear monitors to hear the click, and during the rehearsals also to hear Rick shouting the code names for the different drum patterns that Paul Clarvis and he had worked out. We took the best of those recordings, placed them in a Pro Tools session and sync'ed, edited and layered them, so it became a real representation of all of them playing in a stadium. We had to be careful to sync the parts enough to make them sound live and exciting, but not have them too tight, or hopelessly loose. Putting that together was an enormous amount of work!"

Cobbin adds: "3 Mills Studios is a well-known film studio located less than a mile from the stadium, so it was an ideal location for us to use for access to rehearsals both there and at the stadium. Rick was based there quite a lot along with his manager and music supervisor Mike Gillespie and other associate musical director Allan Jenkins. LOCOG also had its offices there. The studio has large film stages that we used for group rehearsals, but this had to be done in smaller groups of 250 drummers, which was the maximum amount of people these stages could accommodate. This was where Rick and Paul taught the drummers the patterns, and the rehearsals we recorded there also included some of the screaming and shouting that you hear in the final track. By the way, the delay in the stadium was more than half a second, and one issue for us in sync'ing these recordings was to combine giving the illusion of space with keeping the rhythmic timing precise enough. This really was where Kirsty's expertise came into play in working with programmed materials and drum loops and so on. It was a vast editing job."

'And I Will Kiss': The Mix Session

This is the composite Pro Tools session that was used to create the final mix, distilled from over 20 separate sessions used for recording and submixing individual elements. Right at the top of the session are seven effects sends and a composite reference mix, and underneath that is Rick Smith's entire Logic session, a whopping 70 tracks, going all the way down to the Clarvis tracks. Many of Smith's track names refer to various sound sources that were used, including Camel Audio's Alchemy, the Oscar synth, Prime Loops Vanguard Electro Bass, Logic's EXS sampler, D16's Drumazon, Spectrasonics Stylus RMX and so on. Also visible are Smith's whistling and his Underworld partner Karl Hyde's vocals and Telecaster.

Kirsty Whalley: "The LSO On Track orchestra stem is at the top of the material from Rick's Logic session, because we'd made a premix for Rick that he had loaded into his Logic rig, so he could work with it and shape it. The Grimethorpe Colliery Band and the multitrack elements of the LSO recording are shown on the slave Pro Tools session. There are many elements from Rick's session, and we bounced a few things, but overall we imported it pretty much track-by-track and tried to keep it like that. The first track in the session that we recorded is Clarvis temp bounce ['*Clr12*'], which is a premix of some of the overdubs Paul Clarvis played, which are just underneath. Below that are Pass 1-4, which are Evelyn Glennie's recordings. Each of these passes would be a submix of 20 recordings; it's the same with Paul Clarvis's tracks above. Somewhere there are Pro Tools sessions with all these recordings separated out. There's an Evelyn MasterBuss [*track*] underneath, that has some effects on it, like compression and reverb.

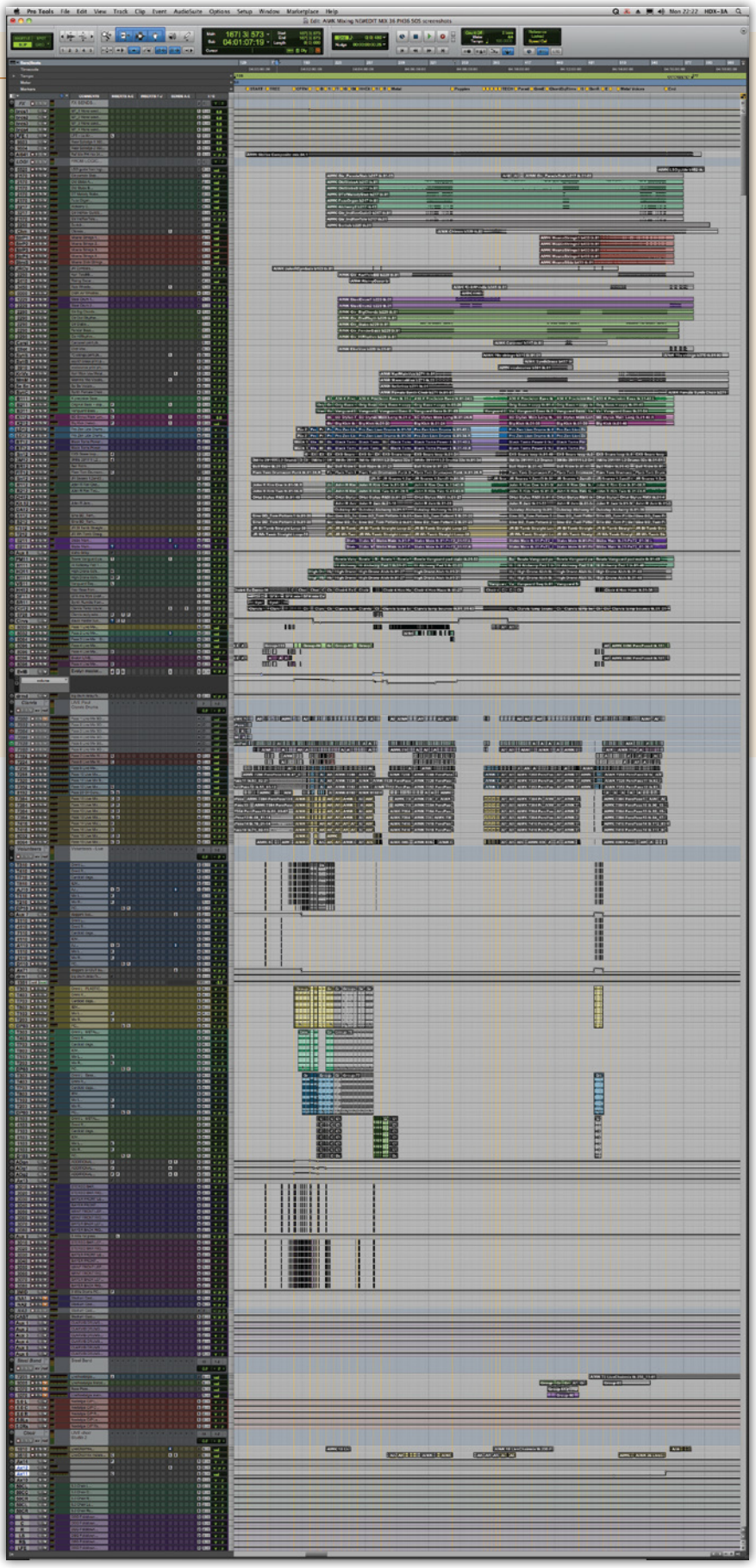
"Below Evelyn's master track are passes 1-19 of Paul Clarvis and the six other percussionists that we recorded at Abbey Road Studio 1, with recordings of bass drums, taikos, oil cans, and so on. Underneath that are all the rehearsal recordings of the thousand volunteers. If you opened those region groups up, you'd find hundreds of edits. We'd select four- or eight-bar phrases for best timing and performance, and then loop the patterns. We made small groups of each patterns on each different take, which formed building blocks that allowed Rick and us to work out new arrangements pretty quickly. When you go further down you can see the 3 Mills recordings aux and the stadium recording aux, and aux tracks for the Paul Clarvis drum tracks. Then there are the Nostalgia Steel Band recordings, followed by the choir and vocal recordings at the bottom of the session."

During the first weeks of these tracking sessions, Whalley and Cobbin would for the most part return to Room 52 in Abbey Road, which is built around an SSL Duality desk. "We went there to consolidate, integrate and premix our recordings, and to work out what we would be doing next," explains Cobbin. "During that period it was more cost-effective to be in a smaller room, though we in fact worked in about every space at Abbey Road, including Kirsty's room and the Garden Room. We did most of the premixing inside the box for easy migration to the Penthouse studio, where we spent the last three months of the project doing the final mix. It has the Neve DFC Gemini console, which can handle 1000 signal paths, including 36 stereo aux sends. But even during that period we'd still use Room 52 to premix and develop ideas and work on some of the other tracks. So many elements were being added and so many demands were coming from the stage and the rehearsal, even right down to the last few days before the ceremony, that we had to work in several places."

Not Like A Film

Although Whalley and Cobbin regularly made changes to the music in response to requests from the theatrical production, they both stress that the project was unusual in that it was predominantly driven by the musical track itself. Whalley: "We were following a script that had time indications that came in the first instance from the musical structure. So everyone would work around that. But because there were so many unfeasibly difficult things to do, like lifting huge chimneys and so on, if the musical timing didn't work, Rick would work with Danny and the music team to rewrite the script and edit the music and give that back to the theatrical production until we got a structure that worked for everyone."

Cobbin continues: "This project certainly was not like synchronising music to film. In the cinematic world events are timing-specific, and not script-driven, and usually we are post-sync'ing the music to the picture, and not the other way round. Because this was a one-off event, before the rehearsals it was hard to imagine what Danny's intentions were, so he would have artists draw up storyboards and basic animations in video form that we called a 'previs', short for pre-visualisation. As all these changes were done to the music and the structure of the whole thing, we all were very concerned, including



Rick, that the music itself would retain its integrity and drive, and wouldn't become like a piece of wallpaper to the action. The music had to have dynamics and points of interest throughout, and we also wanted it to work as a stand-alone piece. The music was the genesis and continued to drive all the automated sets. We feel proud that we were involved in helping create this music that was driving the whole event."

Staying Flexible

After all the live material had been recorded, Whalley and Cobbin, still with Lewis Jones manning the Pro Tools system, moved to the Penthouse, where they set about knocking everything into its final shape. According to Whalley, the project, recorded at 48kHz, was the first they had done in Pro Tools HDX, though for a long time they also had a Logic system running parallel with the Pro Tools rig. "We kept Rick's elements in Logic for as long as possible," Whalley explains, "to allow Rick to make changes to his tracks. He's not used to working day-to-day in Pro Tools and is much more at ease and creative in Logic. So we had tracks set up in the Pro Tools mix session that were inputs from his Logic rig, which meant that he could run it totally live with our session and manipulate things in any way he wanted."

"It was important for us that Rick could continue to be creative," Cobbin adds, "and we did what was necessary to make that work. Once you export things from Logic to Pro Tools the tendency is to psychologically sign off on that Logic session, and we did not want to impose that limitation. Again, we wanted to be totally flexible and for Rick to work the way he usually works, in Logic. Once he felt totally comfortable with particular sounds and parts we would export those tracks to Pro Tools. So over the weeks, while we were recording live elements downstairs and importing them as stems into the main mix session, the Logic tracks in Pro Tools also slowly built up. Stems were essential in the way we conducted the session and to keep all the material we had manageable. We had percussion stems, an orchestra stem, a choir stem, and so on. Working like that was familiar to us from doing film scores. But we always wanted to have the option of going back into the original session, rebalance things and create new stems.

"Our first line of attack when we were coming to the final mix was to physically »

» lay out all the tracks, while allowing that more would be added, and that we might make changes to what we already had. In fact changes were made throughout the whole project, right up until the end, so we made sure that we wouldn't be snookered at any stage. Only towards the very end did we have the layout of the final mix session correct and were able to create a working mix that fulfilled all the criteria that I mentioned earlier on, which is that we wanted to have a great piece of vibrant, heavy-duty, dance-influenced music with a live feel. That was home base.

"From that starting point we did the mix in stages, building on Rick's tracks. We'd have a working mix, and we kept adding things, and every time after we had recorded something else, we'd introduce it in the session and the next time we'd play it, it would simply have that element added. Not all the parts played throughout the whole track, so when we added a new part, we'd often only listen back to the relevant section. With the track being 17 minutes long, we'd rarely listen to it from top to bottom! But Rick's original demo was the heart and soul of everything. He by and large has always done his own mixes, so it was a big thing for him to hand this over to us, and we liaised with him throughout the project to make sure we carried all the spirit and intent of the demo to the final version."

Whistle Stop

Handling such a gargantuan session, both in terms of number of tracks and length, required a lot of improvisation. Whalley and Cobbin laid the whole mix out over the Neve DFC Gemini console, because they wanted to use its summing features and to be able to use some favourite bits of outboard. "Everything went through the desk because it has great summing and busing features," explained Cobbin. "When you have a one-million-pound desk like that, you want to use it! But we did most of the balancing in Pro Tools, and then sent submixes to the desk. We also connected the outboard we wanted to use to the Pro Tools outputs, and the outputs of the outboard boxes came up on the desk as well, so we could automate everything. The outboard we used consisted mainly of reverbs, like six Bricasti M7s, a Lexicon 960 and a TC 6000, as well as a GML 8200 EQ and an Alan Smart C2 compressor. The plug-ins we used were by UAD — especially the Trident EQ, Dbx 160, SPL Transient Designer and SSL Channel — plus plug-ins by Avid, Sound Toys, Massey and EMI/Abbey Road, and McDSP's FilterBank plug-ins, Camel Audio's Phat and Space, Waves' Mercury Bundle and Izotope's Ozone. We also used a beta test version of a Waves plug-in that has been developed in partnership with Abbey Road and is modelled on one of our rare REDD valve desks."

Steel band Nostalgia in Abbey Road Studio 2.

Because this was not a traditional mix with drums, bass, guitars, vocals and so on, Whalley and Cobbin did not have a blueprint as to what to work on first and how to make it sound. Their only option was to build the track up step-by-step as things were added, and to listen and work in sections, but one does wonder how they prevented the track from collapsing under its own weight. How did they keep the track transparent and clear? And how did they manage to keep a sense of perspective, a creative overview of what was happening? If ever there was a project where not seeing the woods for the trees was a serious risk, this surely was it.

"Yes," agreed Cobbin, "but it's the thing I love about mixing. I love that challenge! Keeping a perspective on what you're doing comes with experience, and also from always being aware of what the purpose is of what you're doing. Why are you putting things in? Is it for a creative lift, or to reinforce the bottom end, or to solve a technical problem? Like the Poppy section in the middle where Rick is whistling: it is so different to the aggressive and hard-hitting end section, and then finally the track culminates in the orchestra playing the same tune. All this gave shape to the track, and also meant that we had to use different spatial effects in these different sections."

Whalley adds: "Funnily enough, Rick's whistling was meant as a demo, and we experimented with other people whistling, with what we thought were better mics and a better studio, but nothing had the same feel as his original recording with his Logic effects on it. So we kept it. Our decisions were always based on what worked best in the track. Just because we had gone to the effort of recording something didn't automatically mean that we'd use it if we felt that Rick's original had a better feel or served the music better."

Cobbin explains that the main challenge was to ensure the music kept its shape and interest for the entire 17 minutes of its duration. "Getting the dynamic shape of the whole song right was crucial. Because of all the live recordings we'd done with the thousand drummers, these drums sounded so large that when the techno-section came in, it initially sounded small by comparison. So we had to rework and rebalance and EQ the drummers to make sure that Rick's techno section sounded strong when it kicked in, and then that the track continued to build until that point of release in the Poppy section, and then to continue to climb for another seven or »

Kirsty and Peter with Allan Jenkins (right), the other associate Musical Director. Kirsty: "This is a photo taken inside the stadium when we made a recording (in the rain!) of the huge bell. We had to do this at night, and they called all the workers to stop work for half an hour so we could record the bell."

» eight minutes until we had the orchestra sounding and five rings in space and the sense of massive release in the entire stadium. The entire mix had to have a shape that had a musical logic and that also worked with the timeline of what was happening on stage. That took a lot of juggling."

Stemming The Flow

Another challenge Cobbin and Whalley faced was the fact that the music had to perform well on mono television speakers and in-ear headphones as well as on the million-Watt PA system in the stadium. The duo had to supply a stereo mix for the iTunes release the night of the show, a mono-compatible stereo mix for the front-of-house mixer in the stadium with some elements taken out and stems to replace them if necessary, and a surround mix for broadcasters. To help meet these seemingly contradictory demands, they auditioned their mixes in the stadium, and also rigged up the whole of Abbey Road as what surely must have been the most multi-faceted monitoring system ever devised.

"Yeah," recalls Cobbin, "during the last month before the show we probably heard the track 10 times in the stadium, and each time we would go back to the studio and make alterations. To create a track that would sound good played live on a huge PA system for 85,000 people as well as on the myriads of other systems people throughout the world were watching it on was another big challenge. The first time I went out to the stadium to hear it on the PA system was both thrilling and exciting, but also daunting, because towards the end the track had become just a wall of sound without any definition. It had become too big, so we had to remove certain elements and play with the EQ to clear things out and regain more clarity."

"Because of all the other playback situations that we had to take into account," Whalley continues, "we spent a lot of time thinking how to do this, and we eventually set up hundreds of different systems around Abbey Road, all in different rooms, and listened to the track on each of them. The playback systems included computer speakers, nearfield and big studio monitors, old analogue TVs, flat-panel TVs, laptop speakers, home cinema speakers, iPhones, and various headphones — B&W were very helpful in giving us access to some of their consumer products. We also organised a Source-Connect broadcast so that Rick could receive the mix live on his iPhone via the Source Elements app and put on some headphones and listen in real time to what we were doing. He had so many other responsibilities that it was physically impossible for him to always be there while we were mixing. In this way we would always get instant feedback from him.

"In addition to the finished stereo mix for the iTunes release that same evening, we did an assignable stereo mix without some of the elements that were played live, like Evelyn Glennie and some of other drummers, for the FOH mixers, Richard Sharrat and Bobby Aitkin. These elements were picked up by the live stage microphones and mixed in by them. But we also gave the FOH mixer stems of the elements we had taken out, in case the live stage mics failed."

"The mixes for FOH had to be mono-compatible, because the sound had to be good wherever people were sitting," adds Cobbin. "I'm not an expert on the exact spec of the PA system, but it was assignable or addressable stereo, so it was possible to push the low end through all the speakers and the more spatial content through pairs of their array system. Finally, we also had to do 5.1 mixes for various broadcasters, though it wasn't real 5.1, as we had to keep the centre channel free for broadcast commentary content."

Whalley sums up: "We probably did in excess of 20 mix versions of the piece, and printed all of them to a separate Pro Tools rig and session. We had a GML 8200 EQ and C2 compressor on the stereo and 5.1 mixes, and processed the mix stems separately on the Gemini desk. On the morning of the day of the opening ceremony we were in the studio still doing things to the mix! The pressure had been building throughout the whole period. We used a secure FTP server to move the files to the stadium, as it took too long to take a drive with us and go through security. In fact, we had to work out what time we had to leave the studio to be able to get to the stadium for two or three in the afternoon and still make some changes, if necessary. During the cultural part of the show, Peter and I were in the broadcast output truck monitoring and advising on the mix, and this feed went to the BBC. For the remainder of the show Pete and I were sitting in the stadium and listening to the PA and enjoying the show. It really did all come together at the last minute. We all thought it could be great, but we did not know for sure until the event actually happened!"

As it was, all the hard work paid off. Whalley and Cobbin's mix work was instrumental in helping to create arguably the most memorable Olympic Opening Ceremony in living memory, and inarguably the one that rocked the hardest!

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