The Les Misérables Sound Team: Part 1

By Paul Tingen Sound on Sound magazine 2013

In his quest for authenticity, director Tom Hooper drove his Les Misérables technical crew to completely reinvent film soundtrack recording.

When Tom Hooper was asked to direct Les Misérables in March 2011, the British film and TV director was riding high on the success of The King's Speech (2010). He took the role on one condition: all vocals in the completely sung-through musical would be recorded live on set. As Hooper explained in a promotional interview: "You can tell in your bones that there's something false or unreal about people singing to playback. What will be exciting for the audience is that singing it live has such a profound effect on the power of realism of this story. I thought it was an amazing opportunity to do something genuinely groundbreaking."

Hooper's determination to record live and give the actors complete control over every creative expression, including the tempo in which they were singing, was hugely popular with the actors. Russell Crowe has stated that "There's an emotional level to this that cannot be created in the studio," while Amanda Seyfried has said "It is so much more powerful, you have complete freedom, complete control." For the technical crew, however, the director's vision gave rise to innumerable practical problems that had never hitherto been solved in the history of film-making. Fulfilling this brief embroiled the crew in a painstaking and lengthy process, during which they repeatedly reinvented the ways in which soundtracks for movies are recorded, edited and mixed. The word "impossible!" was exclaimed quite a few times; but the crew made it possible, and Hooper's vision been vindicated by impressive box-office takings, critical praise and an Oscar for Best Sound Mixing.

Proof Of Concept

Production Sound Mixer Simon Hayes, with some of the gear used on set to record the actors.

Tom Hooper had his first meetings with his sound and music teams in the autumn of 2011. Gerard McCann was hired as Supervising Music Editor, and Simon Hayes went on to act as Production Sound Mixer ('recording engineer' to those in the music world). McCann and Hayes explain why Hooper's demand that all the singing be recorded live was widely deemed "impossible".

"We heard that word a lot," explained McCann, "but to be fair, it was usually used by people from outside our team. They'd heard what we were doing and came up to us and said things like: 'We don't see how this is going to work. How will you be able to record vocals of good enough sound quality? And how will you cope with noise on the set? And how will you edit things together with vocal takes that are sung in different tempi? And how are you going to add an orchestra to that?'

"We also never assumed it was going to be easy, and it certainly didn't turn out to be easier than we initially thought! There were problems that we anticipated and had put plans into action to deal with, but there also were complications that we hadn't foreseen and for which we had to find solutions on the spot. We also had to demonstrate to the film's backers that we were able to do this: if you are going to invest millions of dollars in a movie and somebody says: 'This is how we are going to do it,' but he can't point to it having been done before, you are going to want to see some proof! So in February 2012, towards the end of seven or eight weeks of rehearsals, we did some test shoots to be able to demonstrate the whole process from A to Z. We tempo-mapped the vocals out and added a small 15-piece orchestra. This rehearsal period was also helpful because we needed a sense of how long the whole thing was going to run, since the film version is not identical to the stage musical: it has new verses, a new song, different song orders, and so on."

"Tom was also absolutely adamant," elaborates Simon Hayes, "that he didn't want to take the huge risk of recording all the vocals for Les Mis live, and put everyone through the extra time and effort involved — including asking the actors to train so they could sing for 12 hours a day — only [for them] to be told afterwards that their performances would be committed to ADR [Automated Dialogue Replacement, ie. overdubbing after the fact] to be re-recorded anyway. That would have been pure folly, because if you're going to do ADR, then you might as well have recorded the movie in the traditional way and have the actors lip-sync, and save yourself a lot of time and trouble. We had to make absolutely sure that what we set out to do was achievable."

Absolute Freedom

While the approach taken by Hooper and his crew was indeed groundbreaking, some have gone too far in claiming that it was the first time singing was recorded live on film sets or locations. "There have been some misunderstandings," says McCann, "because obviously Les Misérables was not the first movie for which actors were recorded singing live. When sound was first introduced to film in the late '20s, the singing and accompaniments for musicals were recorded live on the set, but gradually the standard way of recording musicals became to pre-record all the vocals to a backing track in a music studio, and play these perfected recordings back during shooting via speakers on the set, while the actors mime to their earlier performances.

"What really makes Les Misérables different is that Tom wanted to give the performers 100 percent flexibility. He didn't want them tied to anything, whether a tempo or a pre-recorded backing track, and certainly not to a musical performance that they had done in the studio two months before they came on the set. Instead, he wanted to give the actors the same freedom to express themselves as they have when they're acting drama. Being in the moment with the timing of a performance is what actors and directors seek the most in drama, and Tom wanted them to have exactly that, in a sung environment, including when there are several actors on the screen musically responding to each other. So the actors had the freedom to perform faster or slower, hold up a certain cadence or sentence or word while they have a thought, walk to the other side of the room before they sing the next line, sing loudly or softly, and so on. The actors could do things that were much more intimate than on a stage; for example, Anne Hathaway singing 'I Dreamed A Dream' almost in a whisper. Because the musical is a big emotional

piece, I think it would have been wrong to have done it any other way. That freedom was what made it exciting and worthwhile for everyone."

"Several movies have flirted with live singing over the years," adds Hayes. "For example, I did a small amount of live vocal recording with Meryl Streep in Mamma Mia [2008]. Ninety-five percent of that movie was lip-sync'ed in the normal way, but there was one song that Meryl wanted to record live, because she was climbing a wall in that scene, and she felt that the pre-record she'd done three months earlier was not going to represent her facial expressions or the efforts that she was making while she was climbing. She thought that it would look false. That situation was a good example of the disconnect that can happen with miming. In addition, with normal musicals you have three- or four-minute dance routines interspersed with dialogue scenes, and you're only asking the audiences to believe miming for short periods of time. Tom felt very strongly that for a sung-through movie like Les Misérables, in which there's very little dialogue, it was taking things too far to ask audiences to watch two and a half hours of mimed performances. I also don't think that would have been believable. Recording the actors the way we did meant that they could really focus on making their feelings apparent, without having to worry about falling behind the musical tempo."

Teamwork

This is all very well in principle, but created enormous technical challenges. One consequence was that all film departments had to change their working methods and work much more closely together than they normally do. "Tom was so single-minded that he did not want to re-record anything," recalls Hayes, "that he called a meeting with all the heads of all departments before we started shooting, during which we all talked through the ramifications of his aim. For example, Tom wanted all department heads to talk to their crews to make sure that there was a completely quiet set, and anything that could be noisy should be addressed. Gerard and I also decided that separating the music and the sound departments wasn't going to work for Les Mis, in part because the singing was treated as both dialogue and as the leading musical element. Our jobs were completely interdependent. It was a massive collaboration.

"Another example is that normally the production team rarely talks to the post-production sound team, but with Les Mis the sound and music post-production teams were brought in from the very early stages to discuss every single decision, so that we had a workflow from pre-production, through production, all the way up till the final mix in post-production. Every single member of these teams had their input in every single decision that was made. This meant, for example, that Andy Nelson, the re-recording mixer, had many conference calls with Gerard and I and the rest of the departments, during which we discussed various scenarios and made sure that he agreed with the decisions we made on the movie set." ['Re-recording mixer' is another film nomenclature anomaly. He or she mixes all sonic elements together at the end of the project, but doesn't re-record anything, other than print the final mixes, so in the music world this person would simply be known as a mixer.]

Booms Or Lavs?

One of the most obvious challenges was how to record high-quality live vocals and allow the singers the freedom to move around freely, yet keep the microphones off camera and make sure that the sets

were completely quiet. Simon Hayes: "Normally on a film set, the production sound mixer prioritizes boom microphones, because they are large, high-quality condenser microphones and they are connected via cables, and give very high-quality sound. Only when boom microphones cannot be deployed effectively, usually because you're dealing with a wide shot and they are pushed too wide, or because of shadows from lamps, do you rely on lavalier microphones. These days, we multitrack and record both boom and lavalier mics, but we still prioritize the booms. Lavalier microphones have smaller capsules, we have to hide them in the actor's clothing, and you have to connect them to a radio pack and transmit the signal via radio waves. All this means that the sound is inferior to that of a boom mic.

"There was an additional problem with Les Mis, which was that Tom wanted to shoot every take with wide, mid and close camera angles, so if he got a great performance from the cast, he had every angle covered and would have coverage for every picture or vocal edit that was done during post-production. Also, if for example Hugh [Jackman] and Russell [Crowe] were singing together, Tom wanted cameras on each of them at the same time, rather than doing things in the more traditional way, where you first have the camera on one person, who will act his or her part, and then you film the other person. When you're shooting multi-camera, you're automatically prioritizing radio microphones, because the booms would not be able to get in close enough with the wide shots. If a boom microphone is stuck at the edge of a wide frame, the acoustics aren't going to match any of the close and mid shots.

"Tom was aware that there have been huge technical advances in the sound, picture and electronics industries, and he told me that he wanted me to use every piece of modern technology available to capture the actors' singing live. I told him about the DPA lavalier microphones, which I discovered a few years ago when doing that live take with Meryl Streep for Mamma Mia. They were designed for both musical instruments and vocals, and sound almost as good as [conventional] condenser microphones. They maybe aren't 100 percent as good, but they're much better than any other lavaliers that are on the market. They have a flat frequency response and don't start to sound chesty or constricted in the way lavaliers normally do. They can also cope with very loud SPLs, which are notoriously difficult for lavaliers. Normally, if someone screams into a small-capsule lavalier mic, it will distort and you have a square wave.

The need to accommodate wide camera angles made DPA lavalier mics central to the sound team's efforts to capture high-quality live singing on set. These were disguised as much as possible using fabrics from the actors' costumes, and later removed from the images using CGI where necessary. The signals were transmitted to Simon Hayes' recording rig using Lectrosonics radio systems."So I decided to use the DPA 4071 lavalier mics, and the next issue was the range and frequency response of the microphone radio transmitter. We are now at a stage where the Lectrosonics Digital Hybrid Wireless system has a quality that is almost indistinguishable from that of a cable. We actually tested the DPA and Lectrosonics system at Abbey Road, with the

music editing team, against condenser mics using professional singers. The music department guys wanted to be sure that they'd have good enough quality vocals to work with! They are used to having Neumann U87s or other vocal mics in a position of priority, ie. there's no camera stopping them from having mics where they want them, and they were very worried that the sound of the lavalier mics would be extremely poor, also because we would not be able to place them right in front of the actors' mouths. But they were pleasantly surprised. They thought that we would be getting 20 percent or so of the quality of a music-studio vocal recording, but it was about 60 percent. They then asked me to use no EQ, compression or limiting whatsoever while recording, so they'd have vocal recordings with full dynamic and frequency ranges to work with.

"That left us with the issue of where to place the lavalier microphones. This is a huge problem in the film industry. When you hide them underneath the actor's clothes, you are at the mercy of the costume he or she is wearing. Some costumes aren't very noisy, but at other times, due to jewellery, or the use of silk or chiffon, you get terrible noise on the dialogue. The plug-ins available now to dialogue editors and re-recording mixers to remove noise are incredibly advanced, but clothing rustle is notoriously difficult to remove in post-production, because you end up also removing some of the frequencies within the voice. This may be acceptable to a minor degree when dealing with dialogue, but it would become very obvious in singing. We knew we couldn't do that. My proposal to Tom was to take a portion of the money in the budget allocated for ADR, transfer it to the visual effects department, and ask them to remove the microphones using CGI. This allowed us to put the microphones on the outside of the costumes, so we wouldn't have any clothing rustle. Ten years ago, that idea would have been way too costly, but the price of doing visual effects has decreased year by year, so we could now use visual effects as our safety net, instead of ADR.The sound team had access to offcuts of all the fabrics used in the costumes.

"Putting the lavalier mics on the outside of the costumes meant that we could place them in a primary position, on the solar plexus, ie. the centre of the chest, which also resulted in better sound quality. The DPA microphones come with a small plastic mount that you use to stick them on the costume, and that also acts as a concealer. I worked very closely with the costume designer, Paco Delgado, who gave me small offcuts of every single piece of costume material that he was using, and my team glued these to the plastic DPA mounts. So although the microphones were on the outside of the costumes, and you could see them with the naked eye, they were disguised to some degree. You didn't see them on many of the wide camera shots, and with the close-up shots the lavalier mics generally were out of the frame, so the microphones only needed digitally removing on the mid-shots. As a result, it was not nearly as challenging as we originally thought it would be. Normally, when you work on a movie, after the picture cut the director sits down with the sound post-production team for an ADR spotting session, to decide which lines need ADR due to poor sound quality. Instead, in the case of Les Mis, the visual effects department had microphone spotting sessions to decide in which images the microphones needed removing and in which they didn't. So the priority shifted completely, and gave a unique strength to the production sound department.

"In some cases, we put more than one microphone on an actor. If an actor had a severe head turn in the middle of a song, we would put one radio microphone on the left side of the chest and another radio microphone on the right side, so we had a lavalier in place for each way they would turn their head, and

the dialogue editor and the music department would have this actor's vocals on two tracks. In other cases, particularly with Hugh and Russell, we'd have one lavalier mic a little closer to the mouth and one slightly further away, where the abdominal section meets the chest, because they had such huge dynamic ranges in their voices and went from very quiet, whispered sections of the songs to being extremely expressive and hitting huge SPLs. In that way we had both the quiet and loud sections covered. I should add that we never recorded one scene where we did not use the boom microphones as well. Whenever we could get them in a close-up position, they became a very good choice for the dialogue editor and the music department. Generally on a movie you will have just one boom operator, though I like to use two, and on Les Mis I felt that the best way of avoiding ADR was to have three boom operators. We had two boom operators who were using the Schoeps Super-CMITs, and their job was to pick up all of the solo vocals, and the third boom operator was using a Neumann RSM191 stereo microphone to pick up the choruses. All of the chorus members were on lavalier microphones, but we also wanted to have a stereo track which was a little further away to add width and texture to the lavalier tracks on the chorus, should the music department want to have that choice."

Don't Shoot The Pianist

The lead actors were given complete freedom in the way they sang, apart from in one aspect: pitch. They needed support to stay in tune, and a bit of help with the song structures, so they weren't totally singing into thin air. But any monitoring fed to the singers needed to be inaudible on the lavalier and boom mics and invisible on the cameras. There was also the issue of how to keep everyone in sync in scenes with multiple singers in multiple locations, and large choruses. "Impossible!" said many, but Gerard McCann and Simon Hayes once again came up with the answers.

McCann: "The rehearsals in February and March 2012 had been done with piano accompaniment — incidentally, that rehearsal period was very important because the entire cast came together as a musical theatre ensemble, and built up a sense of camaraderie that you normally don't get in a feature film where the actors get called in just for their own scenes. For the actual shoot, which lasted 70 days from March to June, we could of course not supply the cast with a full orchestral track, or any pre-recorded track for that matter, because that would have locked the actors into something that was pre-set. Instead, we had a pianist playing live on set — mainly Roger Davison or Jennifer Whyte, who are both experienced West End Musical Directors in their own right, and who know the music for Les Misérables inside out. They were under strict instructions from Tom to always follow the actors and never push them with their playing. What was important for the actors was to hear the pitch, and anything else was icing on the cake. The pianist was effectively the other half of the drama, and even though the pianists were never leading, the actors' performances came out of the musical interaction between the pianist and the actor.

"The fact that the two protagonists, the singer and the pianist, couldn't see each other directly was another obstacle that we had to overcome. To resolve this, the pianist had video and audio feeds of what the actors were doing. This was a big challenge, because watching someone on a screen and hearing them through headphones is an entirely different thing to being in the same space together. The actors would hear the piano via very small earpieces that were on an induction loop on the set, and the frequency and dynamic ranges of the induction loops system are very limited. This meant that the

pianists had to play in the octaves that registered best via the ear pieces, and avoid playing low notes unless absolutely necessary. From the actors' point of view, while it is hard enough to be singing with an orchestra or piano in the room, in this case all they had were these tiny earpieces with sub-standard sound, and they had to pitch their performances against that."

Hayes: "The induction loops and earwigs were a means to an end. The actors were incredibly understanding and did an absolutely monumental job dealing with these earwigs, because they don't sound good. It's old technology, traditionally put in theatres and cinemas and banks and post offices so people with hearing aids can hear in those locations. You have an indication-loop amplifier and play the music through that, and it sends it through a cable and this creates a magnetic field that the earwigs can pick up. We bought the best, most up-to-date products to get the best possible sound quality from them, but they have a limited frequency response, and I very much hope that better technology will become available for future projects. Induction looping also is a black art: you have to work out through trial and error what will give you the best results. We'd always arrive early at a new location to get the best possible loop. When we shot the scenes in Greenwich for the start of the uprising and the parade, we had an induction loop that was a kilometre long! So we pushed induction-loop technology further than ever before, insofar as we know.

"We had to use induction loops because it is notoriously difficult to get many radio frequencies to work together without them interweaving, and we had 26 frequencies for radio mics, plus five channels of talkback systems for the directors and camera operators and for the director and pianist and dialogue coaches to hear the singing, plus two radio booms which we occasionally used. That meant 33 radio channels! Moreover, painting out something on images of human flesh is very intricate and expensive. So we had the earwigs custom-fitted to the actors, and they were so small that you'd have to look directly into someone's ear to see them. But it did mean that their bass response was very limited, because of the tiny driver, and this meant that we had to EQ the piano to the limited mid-range bandwidth that worked best for the earwigs. Luckily this didn't matter when recording the piano tracks, because they were thrown away afterwards, the irony being that those piano tracks were hugely responsible for the performances. Over the course of shooting the film, the piano players developed a hugely personal relationship with the actors because of the very intimate way in which they were being creative with each other."

McCann: "You have to imagine the actors having to sing with this tinny piano sound in their ears, and there'd be maybe 200 people watching them and they'd have a camera practically up their nostrils! That's hard enough on your own, but with scenes in cafés or barricades, with various people moving around and singing off each other, or singing choruses, it's very, very difficult. When recording large crowds we couldn't have 500 earpieces and lapel microphones, but we could accommodate maybe 80 or 90 earpieces. So we would spot the strong singers, and give them earpieces and spread them around and then the others would sing along with them. Simon also had three boom operators recording at all times to complement the multiple radio mics.

"This left the problem of what to do with the ensemble pieces and more rhythmic songs, where there isn't really the flexibility to be pushing and pulling the tempo. I initially argued that we'd have to pre-record a 'bare bones' musical background that we could play back on the set, as we did have some pre-recorded backing tracks for a few songs, taken from rehearsals. But Tom again felt that there was

something about having everyone on the set in the moment deciding what the tempo should be. In those cases, we'd shoot a number of takes and once Tom was happy with one, with a clear tempo, we would use that recording as playback for the remainder of that sequence. The pianist would still play along live, and if the actors wanted to go faster, we'd instantly switch from playback to live piano. Because the sound of the piano was identical, the actors never knew whether they were listening to live or playback. In songs with actors in different locations, like 'One Day More', we would establish a guide tempo during rehearsal, and in this case Russell Crowe, who was in the first scene, and live pianist Roger Davison finessed that tempo on set. This gave Hugh [Jackman], who was in the next sequence, a range of matching tempi he could work within, and from there we built a template for the entire song, and recorded the piano backing for it. This completely pre-recorded piano track was then used as a playback for shooting all the other cross-cutting scenes in this song."

Pro Tools Rigs Are Bonny

Director Tom Hooper was insistent on shooting most scenes with both close-up and distant cameras, meaning that boom mics could not be placed close to the actors. (Photo: Laurie Sparham / Universal Pictures)

"To be able to play back pre-recorded material and tracks from a previous take, we had three Pro Tools systems on the set. The first system, which was driven by my Music Editorial team colleague Rob Houston, was our HD desktop 'recording rig'. It recorded each new take live on external drives, consisting of Simon's mono vocal mix, live piano audio and live piano MIDI, plus it handled direct feeds of a playback of a guide piano and vocal take from a previously recorded performer, where appropriate (for example in 'One Day More'). When required, these direct feeds and clicks came from Pro Tools rig two, which was driven by Rob or myself. Rig two was our laptop 'playback rig', which ran via a Soundcraft Spirit F1 14:2 mixing desk, and it had external drives that were pre-loaded with all rehearsal vocal/piano recordings for reference. As the two systems were networked together, we could directly transfer the files from each newly recorded take from the HD rig across to rig two, so they could be edited, positioned and be ready for immediate playback if required. Pro Tools rig three was our M Box Pro laptop 'prep rig'. We used this for all other tasks. The two other rigs had to be permanently 'online' for the shoot, with each shoot day being a continuous process of setup, rehearsal, shoot, move location, rehearsal, shoot, so I would generally use this third rig to bring material in that I'd asked John Warhurst, my other Music Editorial team colleague, to send over, or to listen more closely to some element of a live take that I wanted to check, or to prepare tempo maps of chorus numbers, et cetera. Rig three was my personal rig. Generally, as the cameras rolled, I would be following the vocal score, listening to the live vocal and piano, while watching direct feeds from the film cameras via video monitors, making take notes and working with the pianists to help guide the tempo, and discussing any music issues with the Music Direction and Production team members present.

"In terms of technical recording quality, or musical and editorial issues — tempo matching between takes, vocal separation with multiple singers, signal path problems such as from a dirty mains feed affecting the piano quality — that was a full-time discussion between Simon's team and mine, where our combined expertise could straddle all these different issues. So the two of us would frequently go on set to discuss with Tom anything we thought we could improve, regarding adjustments to equipment (mics, earpieces and so on) or notes for the actors (such as asking ensemble members to limit movement noise under a soloist's vocal performance). Dramatic performance issues were very much the domain of the director and actors, as they would be on spoken-word drama, although we had the Music Producer, Musical Director and composer on the set much of the time, listening to the live vocal mix on headphones, so they could express any comments they had from their perspective."

Climbing Mount Impossible

Clearly, a lot of audio technology was needed to make all of these impossible goals possible. What's more, all this gear needed to be lugged around locations and sound stages in southern England, where most of the shooting took place, almost on a daily basis. Oh, and there was a French mountain that needed to be climbed...

McCann: "There's one scene with Hugh Jackman on a French mountain at three o'clock in the morning, with him looking cold and bedraggled and you see his fluming breath, and the best way to get that was to actually shoot it on a French mountain at 3am, even though it was a challenge for the actor and the crew who took Simon's Deva hard disk audio recorders up that mountain! The camera and sound teams attempt to keep up with Hugh Jackman on a freezing French mountain. Photo: Laurie Sparham / Universal Pictures But the rest of the on-location recordings were almost all done in a 50-mile radius in and around London, and so for each new location we'd spend two hours preparing and setting up, and unhook everything and wrap it up at the end of the day. We discussed very early on whether we would use something like the Abbey Road Mobile to record everything, and have more of a fully fledged studio approach, with all the mics coming into a big studio-style console, but we realised that there was no way that this would work with the sort of locations that we were working at and the speed with which things would be shot.

"Instead, we initially had our gear outside the sets in a tent, which was alternately freezing cold or sweltering hot, depending on the location and time of day or night, and was also slow to set up. So we then decided to hire a Luton van for the music team, to match the flexibility of Simon's sound van and the van of the video playback unit. All three vans could be cabled together easily. We had all the Pro Tools systems, and the video monitors and the piano set up in our Luton van, so all we needed to do was plug into Simon's pre-existing recording setup. This saved us an hour a day, and when you're doing 15 or 16-hour shifts, that hour is your extra hour of sleep! We affectionately named our van the 'Shabby Road Mobile'. Our laptop systems were often pushed to the limit because it got too cold, or too hot, or because they were knocked around when we were moving from one setup to another. But having three

Pro Tools systems meant that we could always devise a quick workaround if one of them was temporarily out of action. We also needed to make sure that we had power supply backups, like UPSs and so on. If someone plugged in a hairdryer in a trailer some distance away, causing a buzz on the circuit, we wanted to be able to immediately switch to another circuit."

Hayes: "My primary signal paths for recording the vocals were the DPA lavalier mics, going into the Lectrosonics radio transmitter and received on the Lectrosonics receivers, and the boom mics, all going into a pair of Audio Developments AD149 mixers, which, in my opinion, is the very best film-industry mixer on the market today, and then going into two Zaxcom Deva recorders. The Deva 16 gave me 16 tracks, and the Deva 5 had 10 tracks, so I had 26 recording tracks available to me at all times.
I recorded at 48kHz/24-bit. Because we used the lavalier mics, there was no need to go to 96KHz, but it was very important for us to be able to use the full dynamic range of 24 bits, since we were asked by the music department not to ride the gain or use compression, limiting or EQ. If you ride the gain to make quieter passages louder, you're affecting a performance that you're there to protect. Similarly, when he hits full SPL and you compress. So I turned off the compressor/limiter on the mixer and the Devas, and to prevent the automatic limiters kicking in, I lowered the gain of the Lectrosonics so they could handle the loudest possible SPL you can get from a human voice. The transmission system was actually completely quiet and we didn't have issues when recording at low levels. We also didn't want to have acres and acres of cable, so although I sent a live mono mix of the vocals and piano of every take to the director, the picture editor, Gerard, Rob and the pianist, I afterwards would quickly do a download of the entire recording to an SD card, and I gave that to Gerard or Rob Houston, and they'd load it into their Pro Tools systems."

Halfway House

Challenging as it was, the process of capturing acceptable recordings of great vocal performances was only the first stage in realizing Tom Hooper's vision for the film. These vocals then needed to be edited, before orchestration could be overdubbed to them: no mean feat when you are dealing with 20 or more takes for each scene, wildly varying tempos, and endlessly changing picture edits. In next month's SOS, Gerard McCann and Simon Hayes, along with Supervising Sound and Music Editor John Warhurst, Music Editors James Bellamy and Rael Jones, and music recording engineer and mixers Jonathan Allen and Andy Nelson take up the story.

About Les Misérables

For the few remaining uninitiated, Victor Hugo first published his classic novel Les Misérables in 1862. It traces the criminal-to-saint transformation of Jean Valjean, who, while being chased by the pitiless policeman Javert, changes and saves the lives of several people. There are political overtones as Valjean inadvertently finds himself near the barricades of the 1832 Paris June rebellion. The novel has been adapted for film, radio and stage, and the 1980 musical, with French lyrics by Alain Boublil and music by composer Claude-Michel Schönberg, is perhaps the most famous adaptation of all. An English-language version opened in London in 1985 and is still running 28 years later, making it the second-longest running stage musical in the world. The musical also ran for 18 years on Broadway and is set to return there in 2014.

The movie version of the musical had been stuck in 'development hell' since 1988, from which it emerged in 2011 when production began. Les Misérables, the movie, finally premièred in London on December 5, 2012, featuring well-known actors such as Hugh Jackman as Valjean, Russell Crowe as Javert, Anne Hathaway as Fantine (a factory worker who falls on hard times), and Amanda Seyfried as her daughter Cosette (who is rescued and raised by Valjean).

The Silent Set

Gerard McCann: "Simon [Hayes]'s job was to make pristine recordings of what the actors were doing on the sets, and the director and I discussed anything to do with musical interpretation and the choices that would enhance our editing options during post-production. But because Simon's and my jobs were so intertwined, he and I would both police the sets to keep them as quiet as possible. This was a real challenge! We had children, cows, chickens, reindeer and everything else that can be difficult to control on the sets, as well as, in some scenes, 40 people loading muskets and bumping into light stands, plus there were often six cameras rolling at the same time. Everyone was making supreme efforts to minimize noises, including the costume department, the special-effects department, the art department, the camera department, and so on, all to make sure that what we captured could be the final vocal that would sound acceptable when hugely amplified in iMax. It's easy to say, 'OK, this is as good as we're going to get,' but Simon and I were constantly challenging each other to go the extra length and not to slacken in any way in the pursuit of the very best recorded tracks we could achieve. He normally captains his ship, and I captain mine, and I really enjoyed that we supported each other on the set of this film."

Hayes: "The need to keep the set quiet had numerous consequences that affected everyone. We built a soundproofed plywood box for the pianist that we used on these soundstage sets. Although the instrument was a Yamaha CP50 electric piano, with everything else being quiet you could still hear the weighted keys thump. When we were shooting on location, the pianist was in the Luton van in which the music department carried its gear, so that wasn't an issue. We were shooting many of the exterior scenes on sound stages so that we could control the outside background noises, but it's no good shooting an exterior scene inside if the actor's hair isn't moving, so in those cases we needed a wind machine. This has ruined many performances on a film set, because normally if you use a wind machine you're committing the entire performance to ADR. So the special-effects department placed the wind machines far outside the sound studio and rigged hundreds of meters of flexible air-conditioning tubes, and stuck them through the walls of the sound stage. A technician would then hold a tube and point it at the actor. All we had to deal with in this case was the noise of air moving, which sounds like real wind, and is above the human voice, so it can be removed using plug-ins in post-production, if necessary.

"There was also the scene with Samantha Barks singing the song 'On My Own' in the rain, walking down Rue Plumet.One of the most challenging scenes for the sound team was the sequence in which Samantha Barks sings 'On My Own' in the rain. This was a massive collaboration between the sound department and every other department on the set. We asked the special-effects department to make the rain droplets as small as possible to keep the impact noise down, and they got it to a fine mist. At this point the cinematographer, Danny Cohen, said that it didn't look like rain any more on camera, so they made the droplets a bit larger again. We knew then that we had the quietest rain possible. We also got a lorryload of horsehair (the Americans call it hog hair), which is synthetic material used to soundproof cars and buses that comes in sheets of 4x8 feet and four inches thick. We placed that on every single surface that the rain was hitting that wasn't in camera. We put lavalier mics on Samantha, but they kept getting waterlogged. We used new ones for each take, but even so, the post-production team decided that the boom mics sounded much better. But the rain was hitting the top of the boom mic, so we got a one-metre-square frame, put horse hair on top, and rigged that on a second boom pole, and that was held just above the boom mic by the second boom operator. Luckily, Tom used close-up shots for this scene, so we could get the boom mics close enough. The other problem was that the camera was wrapped in a polythene bag and the camera operators had their rain gear on, and you could hear the rain falling on these. We have these rolls of black fabric on film sets, called Bolton fabric, or Duvateen, and we cut big pieces of that and covered the camera and the camera crews with it!

"You can see the level of detail that we went into, including this huge and unprecedented degree of collaboration between departments, to give Tom and the actors the guarantee that these live recordings were going to be usable. The set designers tried to make the sets themselves as quiet as possible, but when Eve Stewart, the production designer, asked me what she could do in this respect, I said to her that it wasn't only a matter of making the sets quieter, because that's not always possible, but also of making sure that stuff that's on camera is real. As a result, the cobbles in Rue Plumet are real, so when people were walking on them or rain was falling on them, it would sound like footsteps or rain on cobbles, and not on plaster. The same, for example, if an oak door was closed by an actor on camera. Rather than use flimsy wood and paint it to look like oak, as you'd normally do, she made it from real oak, so if a door shut behind a line of singing, it would sound like a real door, and we might be able to use the take with that sound in it. In general, we tried to avoid recording incidental sounds, like footsteps, rustling paper, and so on, because we never wanted to risk that these sounds would ruin the vocal recording. We would only record Foley if it was in the shot. So it was the job of one member of the sound department to put carpet down to muffle every single footstep that wasn't in the shot, knowing that Tom would be able to put these footsteps, or any other sound, back in later using the traditional Foley overdubbing method, with complete control over the volume at which he wanted it."

How To Use a Rode Go Lavalier Mic - Rode, Apr 2022

Lavalier microphones – also known as lapel mics or clip-on mics – are small wired microphones that are widely used in filmmaking and broadcasting. They are ideal for recording dialogue as they are discreet and unobtrusive and can be positioned close to the mouth while remaining out of sight. This ensures you can get clean, clear audio in a variety of recording situations, whether that's vlogging, reporting to camera, or recording an interview.

There are two main things to consider when using a lavalier mic: how to position it and how to connect it to your recording device. Let's take a closer look at what you need to know about each.

How to Position a Lavalier Mic

When positioning a lavalier mic, it's important to think about its proximity to your sound source (usually you or your subject's mouth) in order to get the best sound possible. Most lav mics feature an omnidirectional capsule, meaning they pick up sound from all directions and are therefore quite forgiving when recording. However, as a general rule, it's recommended that you position the mic on the chest, about a hand-span distance (20-30cm) from the mouth. This will give you a natural, uncolored sound.

Attaching Your Lav to Its Clip

All lavs come with a clip that allows you to mount the mic onto a piece of clothing. For first-time users, these clips can be a little confusing, but they are very easy to use. Simply slip the windshield off the mic, pinch the spiral clasp, insert your mic into the loop and release the clasp to secure the mic in place. Now you can slip the windshield back on.

Mounting Your Lav

Positioning a lavalier mic is easiest when there is an edge of clothing to secure it to, such as the lapel of a jacket, seam of a button-up shirt, or the edge of a tie. Just be sure to keep the mic clear from any other piece of clothing that may rub against it, as this will be audible in your recording.

If you are wearing clothes that don't offer a strong seam for mounting, such as a singlet or t-shirt, things can get a little tricker. You can mount the mic on a neckline – just be aware that if the mic is right under the neck the sound can be coloured and sound strange. You can avoid this with a looser neckline, or by mounting the mic over to the side, rather than directly below the chin.

If you are wearing a singlet, the shoulder straps are another great place to mount a lavalier mic. This is often the best solution if you are wearing exercise clothing. Or if you want to get creative, mounting the mic underneath a headband also works well. Provided the mic is 20-30cm from your mouth, and does not have clothing rubbing against it, you will get a great result.

Keeping It Concealed

To keep your video looking clean and professional, you may want to consider concealing the cable. You can simply tuck it out of sight under your jacket or run it inside your shirt. Pro sound engineers will use drapers' tape to secure the cable against the inside of clothing; you could improvise

with gaffer tape or even regular sticky tape if you want to keep things out of sight. Using what's known as the "broadcast loop" will give you a neat, professional profile. Click here for an in-depth look at how to mount a lavalier mic on yourself or on talent.

MicDrop

The RØDE MicDrop is a simple cable weight that makes mic'ing up talent with a lavalier microphone quick and easy. It helps to pull the microphone cable downwards through clothing, allowing you to easily plug it into a bodypack transmitter or recording device, saving time and minimising disruption while recording. MicDrop is compatible with all RØDE lavalier microphones - check it out here.

Connecting a Lavalier Microphone to a Recording Device

Once you have your lavalier mounted and positioned nicely, the next step is connecting it to your recording device. There are two things to consider here: what kind of device you are plugging it into and whether you need to connect wirelessly or not. This will determine what kind of equipment you need.

Computers and Mobile Devices

If you are connecting your mic to a smartphone, tablet or computer, the AI-Micro is the perfect all-in-one solution.

The AI-Micro is an ultra-compact dual-channel audio interface that allows you to connect two lavaliers to a mobile device or computer. It features auto-sensing inputs that accommodate both TRS and TRRS lavaliers (no need for adaptors) and also has a high-quality 3.5mm headphone output so you can monitor your audio in crystal-clear definition

The AI-Micro is a great option for vlogging, interviews, mobile podcasting, or recording any video content where you are seated in front of the camera. If the cable on the lavalier mic isn't quite long enough to reach your device, or you need some extra leeway to move around, you can use a RØDE SC1 extension cable.

Cameras

If you are recording into a DLSR, mirrorless or compact camera, or an audio device like a portable recorder, you will need a lavalier mic with a TRS jack, such as the RØDE Lavalier II.

Going Wireless

If you need space to move around when recording with a lavalier mic, such as if you're filming a tutorial or presentation, or you simply do not to be tethered to your recording device, using a wireless system is the way to go. There are a number of options in the RØDE range, but for a compact, affordable and easy-to-use solution, the Wireless GO II is perfect.

Wireless systems are comprised of two main components: a transmitter pack, which is attached to the subject and captures and transmits the audio, and a receiver pack, which plugs into the recording device and receives the audio from the transmitter wirelessly.

The Wireless GO II is a unique microphone in that it features a capsule built into the transmitter pack, meaning you don't need to use a wired lavalier mic – just clip the transmitter onto your chest as you would a normal lavalier. Of course, if you prefer using a standard lavalier mic, there is an input for this too. This is a TRS input, so you need a lavalier with a TRS jack. The Lavalier GO is the perfect option.

Once you have your lavalier set up, simply plug the receiver into your camera using the supplied patch cable and you're ready to go.

Using TRRS to TRS Adaptors

When it comes to using mics with a 3.5mm jack, such as lavalier microphones, you need to pay close attention to what kind of output your microphone has and what kind of input your recording device has – specifically, whether they are TRS or TRRS. (three-conductor or four-conductor - count the rings)

TRS/TRRS incompatibility is a very common reason for microphones not working with certain devices. These jacks look very similar, but with RØDE products we've made it easy to identify what type of connector your microphone has by color-coding them: all TRRS connectors are grey, so they can be plugged directly into computers and mobile devices; all TRS connectors are black, so these can be plugged directly into regular audio and camera equipment.

For example, if you want to plug a mic with a TRRS output like the smartLav+ into a device with a TRS input, like a DSLR camera, you can use an SC3 adaptor.

If you already own a microphone, but it's incompatible with your recording device, don't worry – there are a range of RØDE adaptors that allow you to use a TRS microphone with a TRRS device and vice versa. As mentioned above, when looking to record with a smartphone or computer, the AI-Micro is a great solution that takes the guesswork out of TRS/TRRS compatibility and offers a super-high recording solution.

This may seem confusing but just remember – grey connectors are TRRS for plugging into computers or mobile devices; black connectors are TRS for plugging into audio devices and cameras.