a Masked Ball — Unmasked

SOUND DESIGN on the LAKE STAGE

by PETER RUTHVEN HALL

PHOTOS BY RICHARD THOMAS

Since 1950, the unique floating stage at the Bregenz Festival has inspired innovative stagings of opera classics.

Bregenz is situated in the heart of Europe where Austria, Germany and Switzerland meet on the shores of Lake Constance (known to the Austrians as the Bodensee). Zurich is 100 km away, Munich about 180 km. It is a small Austrian city but it has a bold vision. Its annual festival is renowned worldwide for its spectacular opera stagings, on the lake, and every year over 160,000 visitors attend the productions, swelling the population of just 28,000 by another fifty percent.

In July 1999 British director-designer team Antony McDonald and Richard Jones' extraordinary designs for Verdi's *A Masked Ball* hit the front pages of the international press. Many readers may remember seeing the image of a dark skeleton looming large over an enormous book floating in the lake. In 2000 the production was revived and I was lucky to attend the final performance as the British delegate at the 2000 meeting of the OISTAT Scenography Commission hosted by the Bregenzer Festspiele. The sets have since been dismantled but work is already underway on McDonald and Jones' new production of *La Bohème* for the 2001 season.

The focus of the OISTAT Scenography Commission meeting was lighting and sound design, especially that relating to the workings of this phenomenal enterprise. As a set and costume designer I may not have been the ideal candidate to relay my findings so please forgive any misunderstandings about purely technical matters.

We were privileged to be able to talk to Wolfgang Fritz (figure 1), sound designer for the opera and his team (including his deputy, Peter Geiger) about how he approached such a complex project. Hr. Fritz is head of sound at the Vienna State Opera and also designed the sound for the open air *Turandot* within the Imperial Palace in Beijing, so he comes with good credentials. His technical accomplishments are matched by his artistic skill in utilizing sound reinforcement to communicate the drama of the opera. The key to the soundscape on such a vast stage is directional hearing; i.e. the sound appears to come from the direction of the performer.

Before I delve into details let me explain two prerequisites. First, all the music is performed live: the orchestra sits within a semi-submerged pit beneath the stage (in this instance they were totally masked from the audience); the principals sing and act on stage while the chorus is split into a singing chorus in the pit and an acting chorus on stage. Second, without the acoustic environment of a theatre space, all singers need to be amplified. It is also worth remembering that we are in the open air here—everything must be built off the ground and be weatherproof, from wind as much as from rain.

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Work begins one and a half years in advance of the premiere. There is always apprehension when the sets are presented as most designers do not want the microphones and speakers to be visible. Yet in the open air on a lake the only place for these is within the set. So negotiations begin and compromises are struck as to suitable positions. The consequence has to be a decentralized system for amplification; there can be no overhead central cluster nor anything positioned underwater. But this system actually aids the focus of sound on stage.

○ Sources

As you can imagine there is a forest of fixed and roving microphones to consider. At least in the pit the orchestra and singing chorus have fixed microphones that can be readily balanced. The opera is performed without interval so you can understand that some musicians forget that every sound they make is being broadcast. Sound engineers therefore have to filter out a certain amount of clunking, chat and background noise.

Figure 1

Figure 2

Figure 3

For the 1998 production of *Porgy and Bess* all eighty-eight chorus singers also sang live on stage. It was impossible to test each microphone, to determine who was who on stage or to detect when one had left the stage for a pee. So this time the onstage chorus was not miked. But even if they were, by the time they got to wear the huge masks for the ball scene (figure 2) there would have been different problems to fix.

The stage chorus consists of local singers, dancers and actors who have learned the music but are then asked to mime as their voices can upset the balance of amplified sound. The dancers are even told to move like the non-singing chorus so as not to stand out. All should be proficient swimmers in case they fall in the lake and they do often get soaked when it rains. I suppose, for contractual reasons, this split into a singing and an acting chorus makes sense.

There are 26 fixed orchestral microphones with 8 backups; 8+4 for the singing chorus; 8+8 wireless for principals with emergency replacements; and 3 for the live stage band (played in a soundproof remote location in the festival house). There are also complex stage communication systems for stage management, costumes, props, pyrotechnics, hydraulic control, lighting control, sound technicians on stage all of which require independent control as well as co-ordination. Finally there is a separate system for FOH and a "Voice of God."

○ Speaker Positions

For *A Masked Ball* the rear wall of the book provides an ideal position for the orchestral sound. Speakers are set into the wall but are barely visible. This sound acts as orchestra monitor for the stage singers as well as for the audience. Vocal sound is added to these speakers with a time delay (about one millisecond) to avoid any feedback (after all, the speakers are behind the performers). This "long distance" sound complements the front loudspeakers and pulls the sound further up. "Near distance" speakers are required at the front of the stage (neatly set-in behind acoustically transparent page edges which also double as steps) to both act as directional speakers for the various sound areas (to avoid echoes produced by main loudspeakers in the book wall 30 meters behind the singer) and capture the bulk of the 7,000 in the audience. A balance of the two sources adds a depth, height or distance coordinate to any sound.

This principle works fine until an enormous floating coffin tracks across the front of the stage masking the near-distance speakers. Additional speakers are therefore set within the frame and cover of the coffin (figure 3) and are matrixed to replicate the speakers which they mask as the coffin moves across them. In addition, this coffin is a boat with no mains supply so the sound signal has to be radioed in to battery-powered speakers (a generator would be too noisy).

○ Aural and Visual Communication

The orchestra sits hidden in the pit along with the singing chorus positioned behind the conductor. None can see what is going on onstage. The conductor requires a monitor to hear the onstage singers and the remote live stage band. He also needs to be able to see a reasonably close-up picture of the stage singers' faces to know that they are singing the correct music and in time. There is a camera and specially trained camerawoman who relays this detail to the conductor. The conductor in turn is relayed to large screens set in the voms of the auditorium and to hidden locations on stage. It is worth noting that in Bregenz they are aware of the light emitted by these monitors and therefore adjust their brightness so that they remain discrete. (I grow increasingly frustrated in certain British theatres where the spill from an offstage monitor can be brighter than the stage itself).

○ Sound Areas

Ideally one would divide the stage into 20 sound areas. 10 speakers for each area would require a total of 200 speakers which is neither possible nor practical. Instead Fritz uses just 56 speakers by channelling different signals into each. Their positions are shown in the composite speaker diagram (figure 2).

Fritz in fact divided the stage into 16 sound areas. Based on the law of the first sound wave-front, it is the singer's (original and undelayed) voice that gives the listeners' ears the direction. In order to assist the singers, who are the most important sound sources in terms of timbre and direction, but who cannot sing towards all parts of the audience at one time, Fritz needed directional loudspeakers within each area. These could be built into the set or might pop-up when required on a pneumatic telescopic stand. (It is surprising how little one notices these devices within the large stage expanse). Each speaker in each of the sound areas can be programmed with a time delay—between one and 120 milliseconds—to change the focus of the sound source and all these factors can change as the singer moves from one sound area to another. Just to keep things complicated, there are three casts (playing consecutive nights) who strictly follow the same blocking but variations—both planned and spontaneous—do occur especially when cast members cover for each other. So while the main plot may be recorded, each performance has to adapt moment by moment to the eccentricities of that cast.

○ Balancing Act

It is just about manageable to manually follow two singers as they move left to right and front to back across the stage. But there may be as many eight singers moving independently at any one time. The mixing console is therefore programmed with automatic cross-fades on separate times for the main cues with manual override to cover any unexpected changes. Fritz uses a loudspeaker matrix system with a moving time delay of between 10 and 20 milliseconds.

In all, three sound systems are in operation. One, described as "the moving system", provides directional sound as a performers moves between sound areas. Movement of sound among the speaker complexes is accomplished with a ribbon controller. The matrix system channels a combination of six or seven different sound patterns with appropriate time delays into each speaker. These take into account volume, frequency, balance, wind adjustments and when a singer faces up stage. The third is a digital mixing control system with step by step variations, operating cue by cue much like any lighting control.

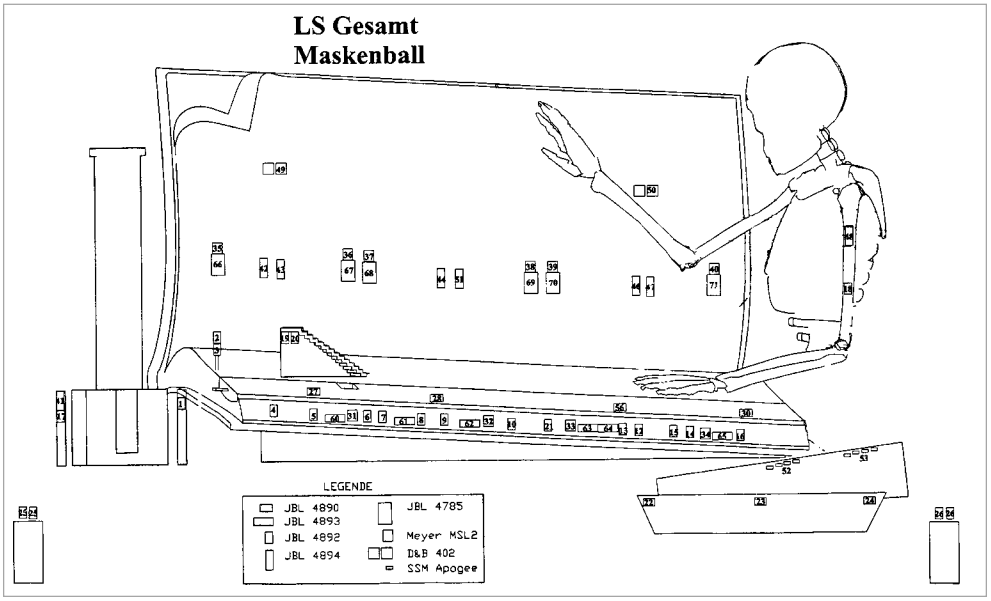

Figure 4

Figure 5

○ Control

The sound control room is situated undercover at the back of the seating with the windows open. The Bregenz Festival uses a TOA-ix9000 digital console with 156 inputs and outputs. This console adapts to increased numbers of channels by using the same controls for different pages: one for principals, one for orchestra, one for chorus, one for effects, live stage band etc. A maximum of 110,000 watts is required for sound.

There are four sound crew on stage, two in control (one on TOA-ix9000, one on direction); one sound designer, one technician, one security/back up, one in the remote studio and one on focus camera work.

○ Contingencies

With so much riding on each performance it would be a disaster if anything went wrong—especially for the house staff who would have to send 7,000 disappointed people home early. The Festival cannot afford to cancel a performance and as each is also continuous (150 minutes) there is no point at which to rectify an error.

Each performer therefore has two radio mics, with two transmitter packs. There are two digital mixing consoles plus a further analogue backup.

Regular maintenance and routine checking is essential. The speaker system is checked thoroughly before each performance. Sometimes cables get dislodged or torn, electrical faults are also noted. But when things do go wrong the policy is to switch off the problem rather than suffer the interference.

○ Inclement Weather

If it rains particularly badly, there is a scaled down version of the production which can be performed in the indoor theatre but only to 1,700 people; the rest get despatched home with or without a refund. But of course it does rain in performance, sometimes quite badly, and thunder and lightening are also regular hazards. The risk can equally be from bad weather before the show as much as during it. Speaker coverings get soaked which adversely affects the sound. Water gets into everything but the noise it creates can be as problematic as the electrical damage it does. Wind is also a problem. When it exceeds 80km/hour the stage has to be evacuated even though the structure is tested to withstand far greater wind speeds.

Whether from rain or sweat, the principals' microphones can easily get damaged. As a consequence they wear a headset with two AKG mics in place. One has a wind cover, the other acts as a backup; both are sweat-safe (figure 5). It is possible for a costumed sound technician to run up to a singer and throw a third one round his or her neck to rectify faults. Last summer in rehearsals a singer even fell in the lake with mics intact and clambered back on stage to continue; a new mic would have been the only solution in this instance had the rehearsal not been discontinued after this historic diving incident by King Gustav!

Good weather also presents its challenges. At temperatures of 30 degrees (86° F.) during the day, the heat affects the high frequencies. As the air gradually cools the sound needs constant re-balancing.

○ Dreams for the Future

Fritz offered two potential developments for future projects. As opera is normally heard within an architectural environment he would like to add the equivalent of room reflections to the acoustic system. This might include speakers behind and to the side of the audience. The LARES Lexicom system points the way forward. The second dream is a combined mix and matrix system with automatic sound-following: 100 sound areas would be possible with moving time delays. He reckons this might take a further three years to develop.

I draw attention to the wonders of designing and managing a sound design for spectacle on this scale. The important thing to remember is that you are largely unaware of the technology, merely impressed that the sound is clear and appears to come from the character that is singing. However, it is impressive how seriously the company takes their work and that all eventualities are anticipated to ensure the production is always of the highest standard.

The new production of *La Bohème* opened on July 18th, 2001. It may be too late to attend the Bregenz Festival in 2001, but it is an absolute must at some time in your career. Information about the festival is available online at www.bregenzerfestspiele.com. ❖

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