

few metres of the source of the sound, it only needs to be quite small to have an amazing effect out over the apron (illustration 4).

A further example of practical experience comes from the memory of a Fidelio rehearsal in a large opera house where a soloist without adequate sound carrying voice was directed by the producer to go downstage towards the apron but without the expected success, as his voice had been absorbed in the orchestra pit and by the front stalls' upholstered seats. Only then was the advice of the acoustic specialist followed, to place the soloist about 3 metres behind the apron, the hard stage base acted as a reflector and the voice "arrived".

The drift to the apron, which Richard Wagner, begged his performers to get out of the habit of, most probably occurred in the back-drop and border days. The covering over of a part of the orchestra pit in Bayreuth is useful, as a reflector to the singers. The open orchestra pits of today do not help the singer. The balance between stage voices and orchestra is best ensured when the apron in front of the playing curtain projects one to two metres over the pit. That too has been proved in the Deutscher Oper, Berlin, in a very expensive experiment, when the apron was subsequently cut off despite all warnings.

It was quite wrong however, when the attempt was made in certain theatres, to lay carpets on the orchestra floor to mute the orchestra. The sound was not reduced as a whole, only the high notes. During the rehearsal of an operetta, the acoustics specialist, who had not then seen the carpet, asked, from the front stalls, whether the orchestra had replaced the oboes by saxophones. That was not the case; the oboes, directed downwards, had lost their upper tone range. The error was remarkable and



Fig. 4.
"The Flying Dutchman" Bayreuth 1957 — Final scene.

Stage Design: Wolfgang Wagner
The projected image of the ghost ship becomes smaller going away into the open sea. In the projection surface, just a few square metres large, a reflector has been let in, so that Senta hurrying after the ship, remains audible in the auditorium until the very last beat.

convincing, and what was more, the musicians could hear that their instruments were not so easy to play, and as an unconscious consequence they forced their playing. The orchestra was not muted to the benefit of the stage voices, but it sounded darker, muffled and solid. In the immediate proximity of the source of sound, absorbers are harmful, especially those in column c) of the table. The conductor alone is able to notice the balance, restrain the musicians, cultivate the beauty of the piano playing, and with the music making, to listen to the stage voices and adjust. Artificial means of acoustics are to be rejected. To this belongs the introduction of loudspeakers into the

orchestra, by which means the stage voices would be audibly reinforced; the orchestra musicians would no longer be able to appreciate whether the balance was there or not.

When stage designers and producers have not thought about the natural acoustic consequences in advance when designing the scenery, then with the first rehearsals, using the scenery, some acoustic experiments ought to be arranged. Often, music deficiency is compensated for with trifling corrections, changes of material, or with reinforced coats of paint.

To the three rules mentioned at the beginning, a fourth should be added:

4th rule: To the first scenery rehearsals belong acoustic tests which take into consideration the intended placing of the performers, especially when scenes are planned for the depth of the stage or otherwise right away from the central playing area. Here it must be considered whether the chorus or crowds shield the reflectors, important to the main performers, by being absorbent masses.

With the application of rule 4 direct observations should be made during the try-out period. There will be objections that there are already superabundant scenery, lighting, costume and orchestral rehearsals so why in addition should the stage acoustics be tested. The simple answer being that the critical ear can observe the effect of the fixtures and furnishings on the spoken and singing voices, especially when the stage direction calls for extreme positions on the edges of the central playing area. The testing of the acoustics is only one of the many critical items which the stage managers and musical conductors should consciously heed. A few examples will illustrate this: Sarastro's final aria in the "Magic Flute" is not the only already well known example, where an especially musically effective Coda has to reach the auditorium from one performer at the depths of the stage through a festive chorus group and crowd. When the crowd often clothed in an expensive manner cover the reflecting surfaces laterally and on the floor, when a free passage in front of the singer appears to be all too conventional to the director, then there only remains additional acoustic aids, such as raising the singer a few steps, or covering his position with a reflecting baldachino.

The acoustic deficiency, is thus often first evident in one of the last costume rehearsals. At this point stage designers and technicians should be able to bring, in suitable sound mirrors, imaginative yet with the clear technical purpose of heightening the performance.

It is not always possible to conceal this acoustic correction from the audience, as Wieland Wagner did with the first entry of Elisabeth in "Tannhauser". (illustration 5). Following her entry she had to walk a long way from the back wall of the hall — which was constructed of high walls without visible ceiling — forward up the centre of the stage. Her greeting had to sound spontaneous upon entry. A large sounding

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