

balcony fronts was developed to provide useful lateral reflections, to introduce a degree of diffusion and to reduce the danger of echoes and focussing from surfaces which are concave in plan.

The pit is relatively large and deep due to the brief to accommodate 80 players. This is a very large band for an opera house of circa 2000m³ and any attempt to place the whole pit in front of the stage would have destroyed the architecture of the auditorium, absorbed 800-1000m² of the stalls area and made the possibility of achieving the right balances between the pit and stage sound impossible to achieve, especially with young voices. This pit followed the ideas of a semi covered pit originally of course pioneered by Wagner in the Festspielhaus, Bayreuth, and recently at Snape, Glasgow and Buxton. A Mozart band can be accommodated in the open section between the orchestra rail and the edge of the stage but a large band requires the placing of the brass, some woodwind, tympani and basses beneath the covered section. This is not an acoustically comfortable position despite the incorporation of curtaining, carpet and absorbing elements in the rear of the pit. This remains an insoluble problem where large orchestras are now used in very small opera houses. There is no doubt that modern instruments aggravate this problem of balance, they are appreciably louder than the instruments of the 18th and 19th Centuries and in addition the young student players of our orchestras appear now to be playing with as much power as their colleagues in the professional orchestras!

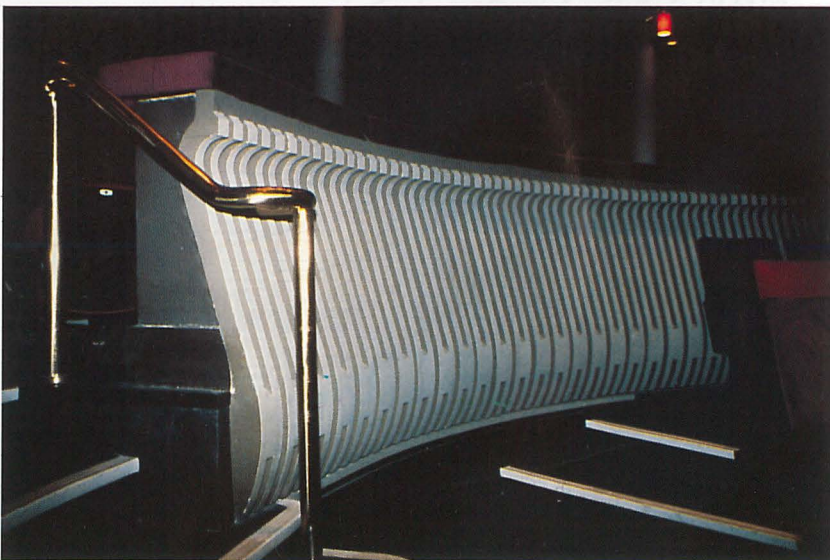
Attention in the acoustic design was also given to the stage and flytower. The maple stage, sadly invariably hidden by a stage cloth, is semi-sprung using composite isolation pads which ensures that the stage, while maintaining resilience for the Ballet, is quiet for the Opera. The soffit of the flytower is finished with sound absorbing material to avoid the danger of a double decay, particularly when the flytower is empty.

Sound Insulation

At an acoustics conference some few years ago a few of those particularly concerned with auditorium acoustics were gathered together to discuss with Professor Lothar Cremer his views on the present state of the art. He was asked by one of the less retiring members of the group as to what was the most important factor in auditorium acoustics and the reply was immediate "why loudness of course" given in his typical didactic style. To achieve this, a quiet background is essential. The site was favourable with regard to transport noise, with surrounding buildings providing protection from traffic. There were no adjacent railways either above or below ground, a rare luxury today especially in Central London, and no aircraft directly overhead. Despite these advantages the theatre was built within the existing courtyard between the existing College and Imperial College and only a pipe's length of the organ from the existing



Britten Opera Theatre. Volume 2146m³, 405 seats.



The convex profiling of the balcony fronts provide useful lateral reflections to reduce the danger of echoes.