Proceedings of The Institute of Acoustics

NOTTINGHAM CONCERT HALL AND DERNGATE CENTRE NORTHAMPTON

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RHWL PARTNERSHIP

The briefs for the 2500-seat concert hall at Nottingham and the 1500-seat multi-form space at Northampton had one strong similarity, the Client in both instances recognised that the provision of a single purpose major space was becoming an obsolete concept for most cities. Only capital cities can justify the massive outlay for building an opera house, concert hall and national theatre to produce or receive a particular type of performance. Furthermore the nature of the performance type itself is undergoing a great change.

For 100 years the Musikvereinsaal in Vienna has been held up as the epitome of a fine concert hall with great acoustic quality. At the time of its opening there was no other way of hearing the true sound of a Beethoven symphony whereas now the quality of broadcast and recorded sound enables people to hear a fair resemblance in their own homes. From an audience point of view the emphasis in the design of a concert hall has now moved to being involved in the performance, with all its inherent requirements in relationships, distance and sightlines, without sacrificing acoustical quality.

From the Client point of view pop shows are better box office news than concerts; conferences have a beneficial effect upon hotel and catering and thus the general prosperity in a town but, in commercial terms, the best show of all is one attended by 1500 dealers for the launch of a new Leyland truck. The financial viability of a venue depends upon attracting, by providing excellent conditions, a range of products which will appeal to the largest possible cross section of audiences thus enabling it to operate 7 days and nights a week.

The briefs for both these buildings therefore recognised this changing world and each demanded a specific degree of flexibility in use and thus a need to vary the character of the space and its acoustics to achieve a suitable ambience. The concept of mechanically adjusted acoustics, as developed in North America, seemed appropriate to our philosophy, resulting in the appointment of Russ Johnson with whom we had previously worked overseas.

In the past multi-purpose halls, in their attempt to accommodate a wide range of functions within their space, have proved far from ideal for any single use because each separate setting had not been fully considered.

The Derngate Centre at Northampton is a multi-form hall with a capacity for 1500 people. Its design is based on the use of a system of movable seating modules which, when arranged for a particular function, has a format which appears and sounds right in its own context. The classical concept of raked stalls and circles developing into side boxes is employed although some of the box towers and all the stalls seating are movable on air castors. Large elevators lower the seating waggons to a storage zone leaving the auditorium free for flat floor events.

This permits five principal formats: 'lyric' with proscenium stage and fly tower; 'concert setting' for music and conferences; 'arena' for indoor spectator sports; 'flat floor' for exhibitions, dance and banquets and 'reduced form' for small scale events.

For music performances on stage the fly tower can be cut off by interlocking

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Nottingham Concert Hall is a space designed primarily for all forms of music with an emphasis upon classical music yet with an anticipated preponderence of bookings for all forms of pop music. The auditorium is also designed for stage shows and dance, films, conferences and trade launches.

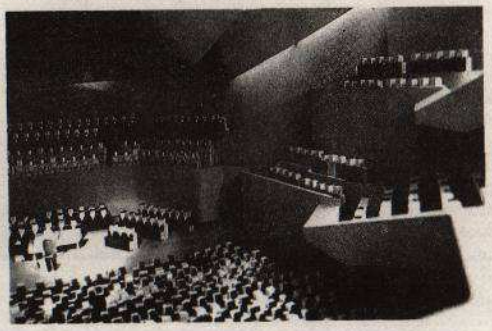
Our experience in relationships between the audience itself and between audience and actors began in our work on the Crucible Theatre in Sheffield and was enriched by the understanding of Phipps' and Matchem's skills in Victorian theatres such as the Nottingham Theatre Royal. The concept was developed with balsa interior models, not of flat planes but carved to induce a sculptured single space focusing onto the performance. The platform is a multi-function area, i.e. a fixed stage capable of receiving a range of events without altering the configuration of the seating within the auditorium. Thus, it is designed primarily for major symphony use with retractable choir but with wing spaces and an orchestra pit and with drive-in access from the road. The use of parallel side reflecting walls in the crucial "front of platform" zone performs three vital functions: provides early acoustic reflections,links the main body of the audience to the stage and permits various options for presenting stage shows and dance.

The large seat count, by normal concert hall standards, demanded considerable reflections from angled ceiling planes to specific zones of the auditorium. These were developed in conjunction with a "necking" above the front of the second tier to achieve the correct balance within the main volume. The development of this crown ceiling was carried out in model form on both sides of the Atlantic simultaneously. The acoustical philosophy of hard materials throughout the Hall extended to this ceiling of dense plaster on sprayed Gunite with all piercings for lights and equipment fully sealed.

Acoustical adjustment is achieved by a canopy and banners. The movement of the 30 tonne canopy, incorporating elaborate sound lighting and hoists, adjusts loudness, clarity and reverberance and has a crucial role in adjusting early arriving/late arriving sound. The acoustic banners, applied to the principal sloping planes of the ceiling, therefore assist this adjustment and can compensate for the actual capacity of the Hall.

The Hall is equipped with a major sound reinforcement system including flown sound bridge and movable towers and a Copeman Hart organ with its speakers integrated into the acoustic design of the ceiling.

The Concert Hall opens in December 1982 and will have been designed and built, at a construction cost of under £10m, in slightly over 3 years.



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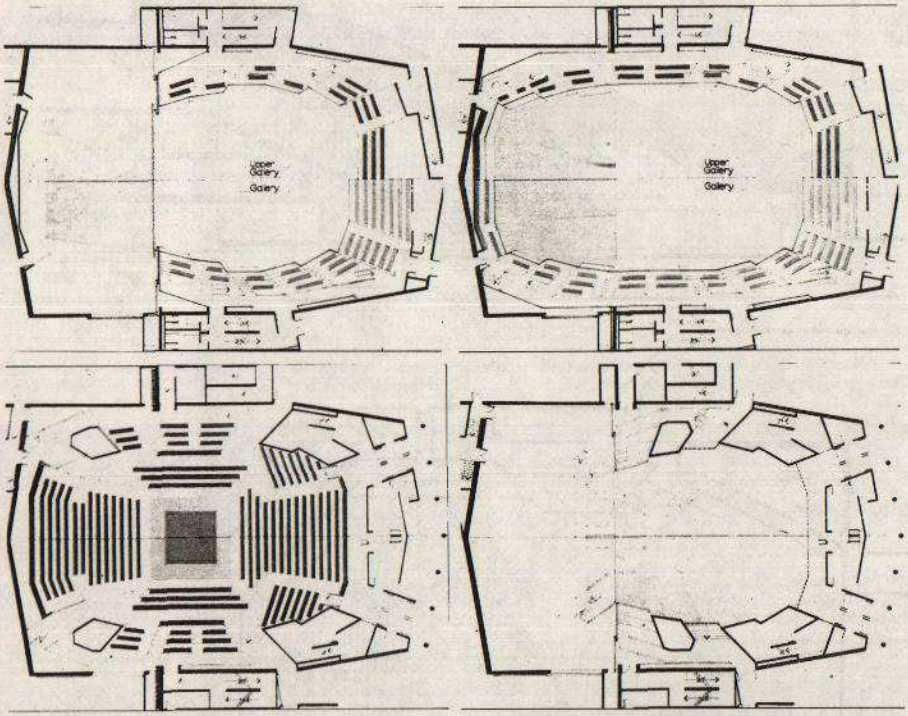
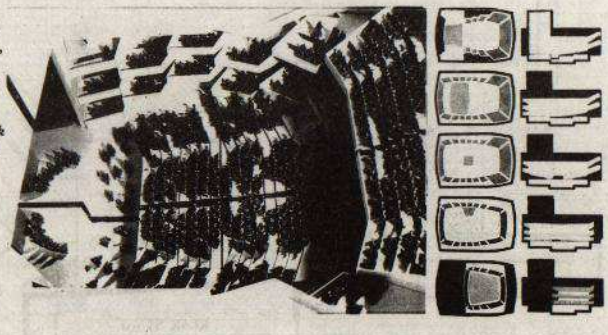
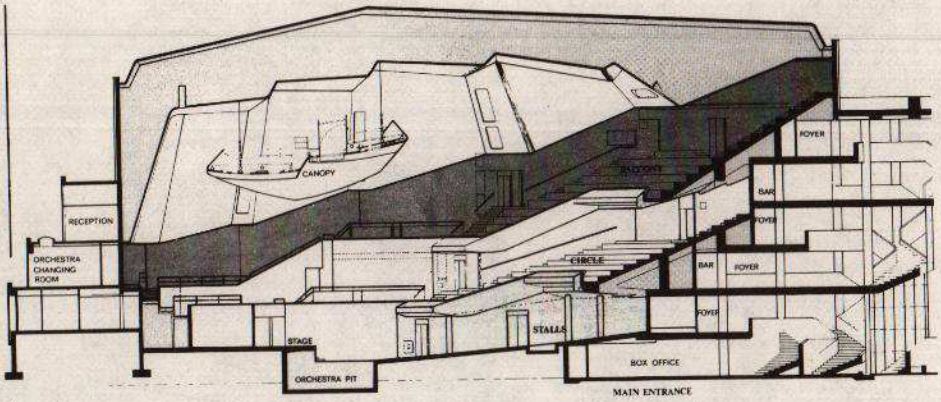
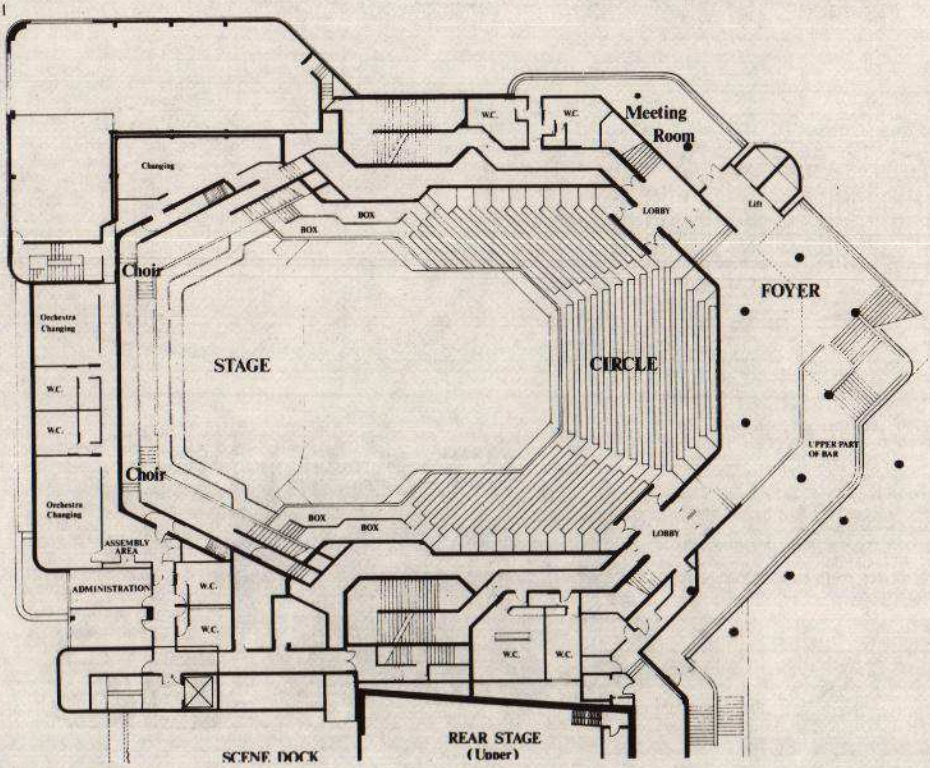
flown timber reflectors. These will visually continue the main auditorium ceiling in the flat floor format.
Vertical acoustic banners can be lowered behind the side seating to adjust the absorption of sound energy and again modify the character of the Hall.



(Far right) the five main stagings that will make the Derngate Britain's first 'multi-form' venue: (top to bottom) 'lyric', 'concert', 'arena', 'flat floor' and 'reduced format'. (Above) architects' plans for the gallery seating levels: (clockwise, from top left) 'lyric', 'Concert', 'reduced format' and 'arena'. (Near right) model showing how the 'lyric' setting will look when the auditorium houses an audience. The key to all these configurations? Placing the seating units on mobile air pads




CANOPY
RECEPTION
ORCHESTRA CHANGING ROOM
STAGE
ORCHESTRA PIT
STALLS
CIRCLE
FOYER
BAR
FOYER
BAR
FOYER
FOYER
BOX OFFICE
MAIN ENTRANCE


Meeting Room
W.C.
W.C.
Changing
BOX
BOX
LOBBY
Lift
Choir
FOYER
Orchestra Changing
STAGE
CIRCLE
W.C.
W.C.
Choir
UPPER PART OF BAR
Orchestra Changing
BOX
BOX
LOBBY
ASSEMBLY AREA
ADMINISTRATION
W.C.
W.C.
W.C.
W.C.
SCENE DOCK
REAR STAGE (Upper)