SOUND REINFORCEMENT FOR THE ADELAIDE FESTIVAL OF ARTS

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INTRODUCTION

The Adelaide Festival of Arts was opened in Saturday 12th March, 1960, at Elder Park, near the Torrens Lake, by His Excellency the Governor-General Viscount Dunrossil. In addition to many Parliamentary and Civic leaders, an audience of approximately 30,000 attended the opening ceremony and extensive sound reinforcement facilities were provided to enable these people to enjoy the proceedings fully from even the more remote parts of the enclosed area.

GENERAL

Preliminary planning for the opening commenced in October, 1959, and the Festival Outdoor Productions Committee decided that three production stages would be used during the evening. These were:—

(a) The "Advertiser" Sound Shell.
(b) A temporary platform adjacent to the boat landing stage.
(c) The Band Rotunda.

Throughout the evening each of these locations became a sound source and therefore, to preserve realism it was necessary to arrange the loud speakers so that at all times the sound appeared to come from the appropriate direction. The positions of the three stages are shown in Fig. 1 and in a photograph of Elder Park (Fig. 2).

Two methods of providing the necessary sound re-inforcement were possible. These were:—

(1) Multiple loud speaker networks consisting of a large number of loud speakers operating at low power and each loud speaker covering a distance of approximately 100-150 ft.

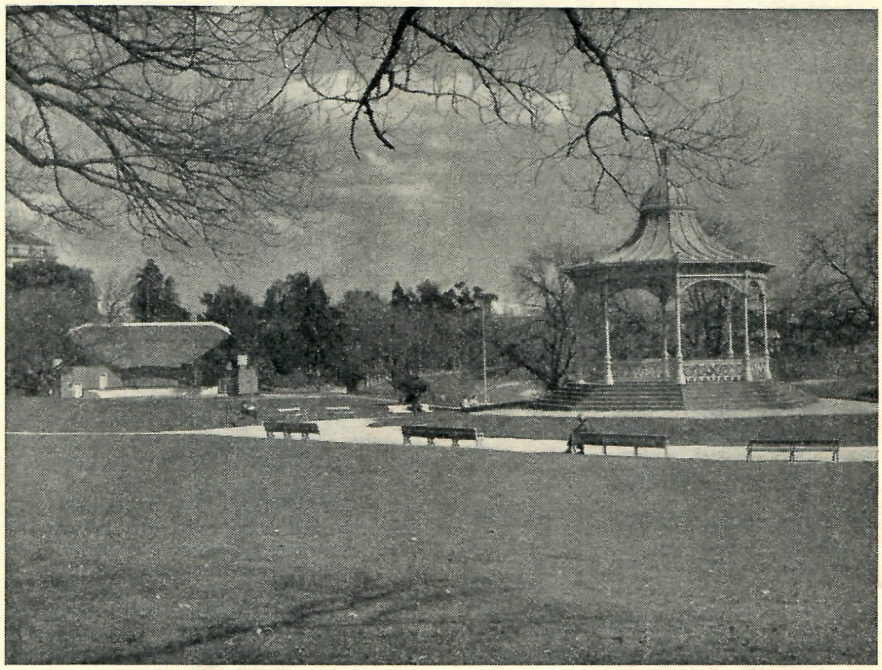

Fig. 2.—General View of Elder Park.

(2) Large, high power loud speaker arrays covering distances of up to 500 ft. without appreciable reduction in sound intensity.

In view of the use of three production stages, method (1) would have required a large amount of delay equipment and extremely complicated switching arrangements. Furthermore, suitable loud speakers for erection in large arrays were readily available and for these reasons method (2) was selected and used.

The loud speakers chosen were Philips 5x6L 20-watt column speakers suitable for external mounting. The polar pattern of these appears as a very narrow beam in the vertical plane and a broad beam, approximately 90° either side of the speaker axis, in the horizontal plane. In addition a plot of "sound intensity" versus "distance from the column" shows a remarkably flat curve for distances of up to 100 ft. By stacking a number of these column speakers in a vertical array this flat intensity characteristic may be extended up to distances of 500 ft. or more, dependant upon the number of columns used. These characteristics resulted in the universal adoption of column speakers on this occasion and necessitated the erection of a total of 22 speakers in eight locations.

By using column arrays it was therefore possible to restrict the use of delayed sound to a minimum. In actual fact no more than two sets of delayed speakers were in use at any time. These were used to feed the Poplar Drive and north of the Rotunda, both difficult areas in which to provide sound reinforcement by other means. It will be apparent that the use of these delayed speakers created switching problems as the amount of delay at any instant depended on the production stage in use at the time. Further details regarding this will be given later.

In general all speaker arrays of two or more columns were fed from two amplifiers, that is approximately half of the speakers from each amplifier. In the event of an amplifier failure therefore, the fall in sound intensity would prob-

*See page 154.

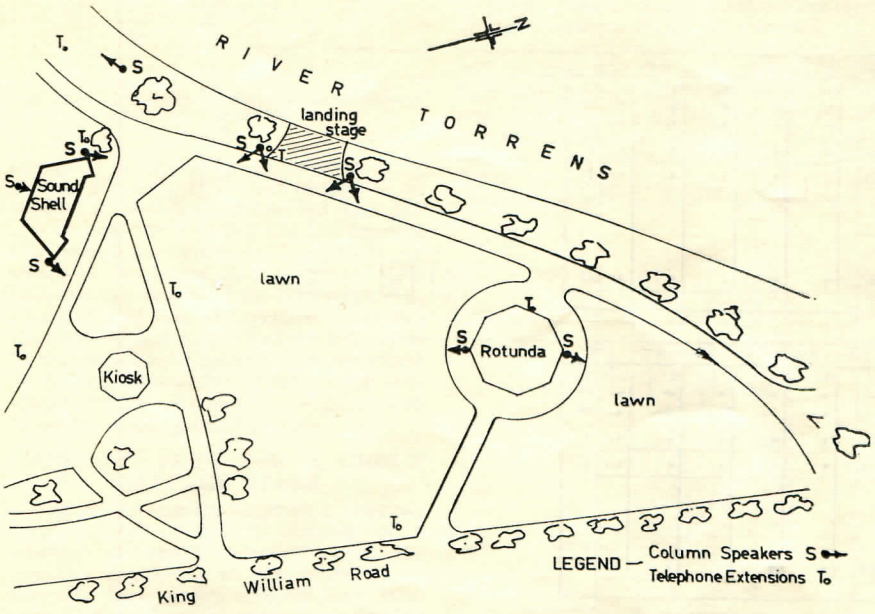

Fig. 1.—Geographical Layout.

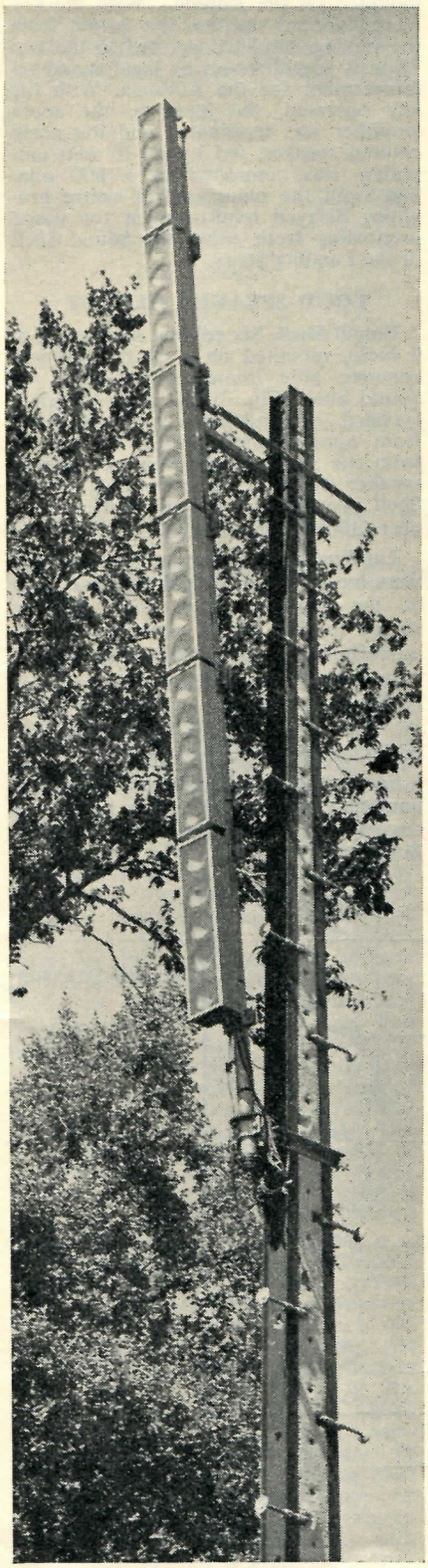

Fig. 3.—Loud Speakers behind the Sound Shell.

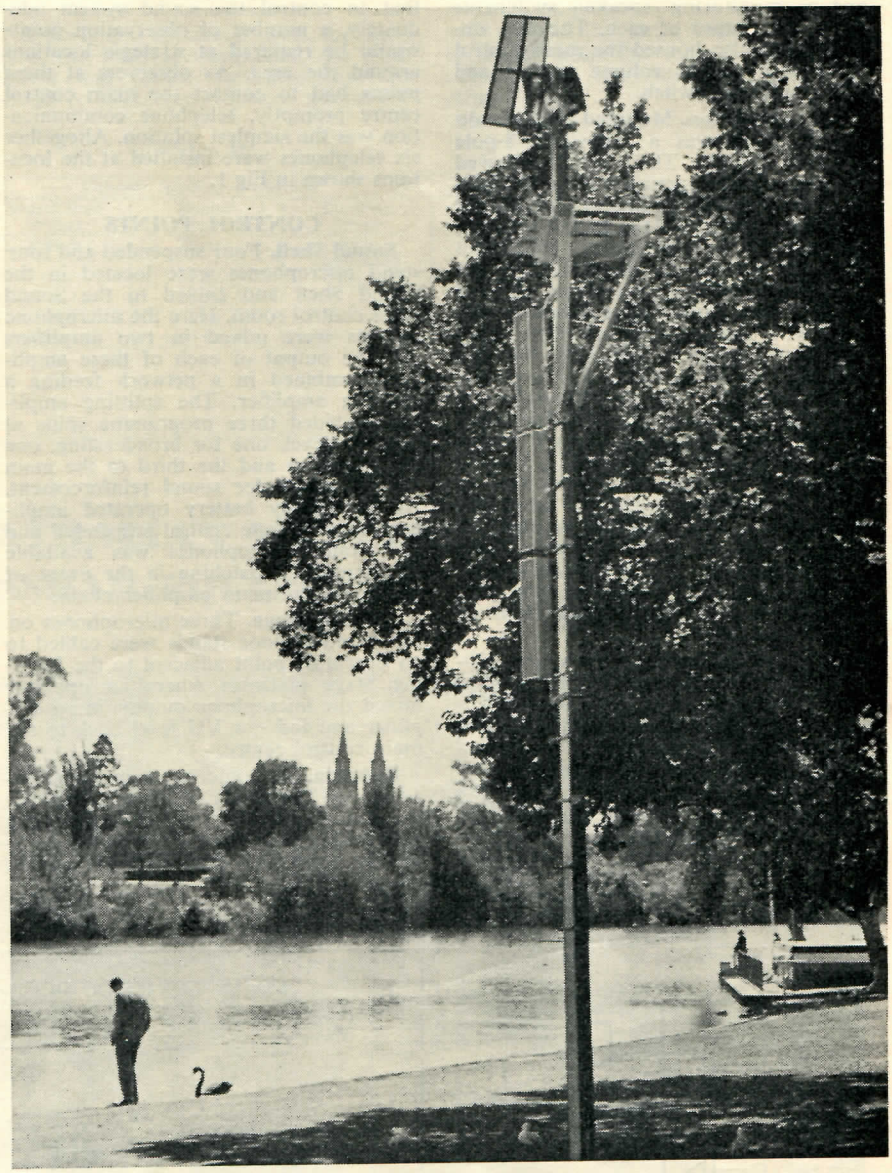

Fig. 4.—Loud Speakers for the Poplar Drive.

ably not have been noticeable to the majority of the audience.

In addition emergency facilities were also provided in the event of failure of the A.C. operated pre-amplifiers at the Sound Shell and failure of the mains A.C. supply. These emergency arrangements will be discussed later.

TIMETABLE

A brief outline of the evening's programme, giving some indication of the switching problems which were encountered, is shown in Table I.

It will be apparent that a considerable amount of switching was necessary and this was carried out in the Main Control Centre, at the rear of the Sound Shell.

MAIN CONTROL CENTRE

General. This control centre provided the facilities and equipment for selection of the programme source for sound reinforcement, the necessary amplification from +8 VU to speaker level and the distribution with appropriate sound delays to the various loud speaker locations. In addition, extensive monitoring facilities were provided.

Rack Layouts. There were three racks, the sound delay equipment rack and two amplifier racks, the latter each mounting four Philips 120 watt booster amplifiers with input faders for each amplifier

Table 1

Time	Item	Location
P.M.		
6.00-7.15	Music	Landing Stage
7.25	National Anthem (6 bars)	Sound Shell
7.30	Fanfare	Landing Stage
7.35	National Anthem (complete)	Sound Shell
7.40	Speech (Governor-General)	Sound Shell
7.45	Concert	Sound Shell
9.35	National Anthem (complete)	Landing Stage
10.35	Music	Alternatively Landing Stage and Rotunda

and a monitoring speaker switchable across the output of each. The first amplifier rack also housed the main control panel with master volume control and source selection switch.

Source Selection. Mounted on the main control panel was a 2-position 8-pole selection switch. This switch allowed selection of programme material originating from either the Sound Shell or the Landing Stage to be fed to the input of the sound re-inforcement equipment racks via the master volume control. At the same time the appropriate delayed sound outlet from this equipment was switched to the input of each of the eight 120 watt amplifiers and also the 600 ohm line to the Rotunda. For example, in the case of programme originating from the Sound Shell the amplifiers feeding the column speakers located immediately behind the Shell (see Fig. 1) were switched to "direct" whilst the line to the Rotunda was switched to a delay corresponding to 500 ft., that is, the distance between the source and the remote column speakers. The sound delay unit was of the magnetic paper disc type, providing up to 4 delays ranging from 40 millisecs. to 1 sec.

Stand-by Equipment. A spare 120-watt amplifier was provided for emergency patching. A battery operated 20-watt amplifier with local microphone was also available for emergency announcements in the event of mains power failure.

Telephone Switchboard. The necessity for a telephone switchboard was realised during early planning as it was apparent that to control the sound system adequately, a number of observation points would be required at strategic locations around the area. As observers at these points had to contact the main control centre promptly, telephone communication was the simplest solution. Altogether six telephones were installed at the locations shown in Fig 1.

CONTROL POINTS

Sound Shell. Four suspended and four stand microphones were located in the Sound Shell and cabled to the Sound Shell control room. Here the microphone outputs were mixed in two amplifiers and the output of each of these amplifiers combined in a network feeding a splitting amplifier. The splitting amplifier provided three programme splits at +8 VU level, one for broadcasting, one for television and the third to the main control centre for sound reinforcement. An emergency battery operated amplifier fed from one central suspended and two stand microphones was available for immediate patching in the event of failure of the main amplifier chain.

Landing Stage. Three microphones on three-section floor stands were cabled to an operating point adjacent to the Landing Stage platform where an operator mixed the microphone outputs in an amplifier and fed +8 VU level back to the main control centre.

Rotunda. Two microphones were connected to a battery operated amplifier the output of which was then fed via key switching to two 70 watt amplifiers feeding the north and south column speakers mounted on the Rotunda. With the key in the normal position the output from the mixing amplifier wes fed to the two 70 watt amplifiers giving local sound reinforcement for the Rotunda. With the key operated, the input to the south amplifier was terminated and the north column speaker, fed by its 70 watt amplifier, was connected to a 600 ohm line from the main control centre providing delayed reinforcement for sound originating from either the Sound Shell or the Landing Stage.

LOUD SPEAKER LAYOUT

Sound Shell. Six column speakers (5 x 6 inch), mounted on a 60 ft. steel and concrete pole immediately behind the Sound Shell (Fig. 3) and angled slightly forward, gave adequate sound coverage from approximately 100 ft. to 500 ft. from the Shell. In addition one column speaker mounted on each wing of the Shell provided for sound reinforcement up to 100 ft.

Landing Stage. Seven column speakers were mounted on two poles on each side of the Landing Stage with speakers angled to give overall coverage.
on each side of the north and south sides

Rotunda. Four column speakers, two of the Band Rotunda and situated above the roof permitted high level sound with minimum acoustic feed-back.

South Bank Poplar Drive. Three column speakers stacked to give long-range coverage for the Poplar Drive are shown in Fig. 4.

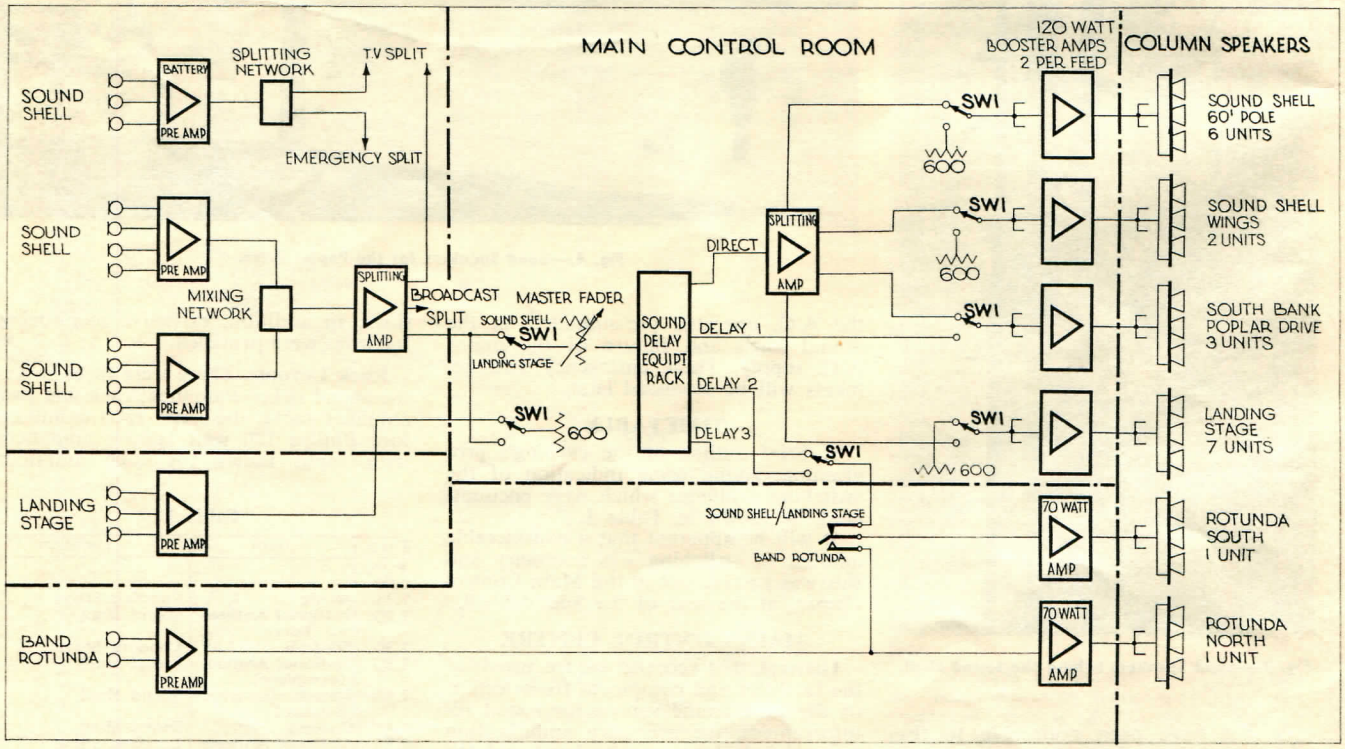

Fig. 5.—Schematic Circuit.

Sound Delay Details. Details of the sound delays used are given in Table II:

SCHEMATIC CIRCUIT

The schematic circuit is shown in Fig. 5.

CONCLUSION

Reports and comments from the audience, the Festival Committee, the Conductor and soloist, indicated that the sound re-inforcement system adequately met the requirements of the occasion and allowed the large audience present to enjoy fully the impressive opening ceremony of the Adelaide Festival of Arts.

Table II

Source	Column Speaker Locations					
	Sound Shell 60 ft. pole	Sound Shell Wings	Poplar Drive	Landing Stage	Rotunda South	Rotunda North
Sound Shell	Direct	Direct	Direct	Not connected	Not connected	.44 sec. (500 ft.)
Landing Stage	Not connected	Not connected	.18 secs. (200 ft.)	Direct	Not connected	.27 sec. (300 ft.)
Rotunda	Not connected	Not connected	Not connected	Not connected	Direct	Direct