

# "CONTROLLED SOUND" FOR MODERN THEATRES

Over 30 performances have proven that proper control of sound induces physiological, physical and psychological effects—hysteria, for instance, in 40 seconds! (Controlled sound and 3-dimension movies would go far toward producing highly dramatic talkies.)

HAROLD BURRIS-MEYER

**A** TECHNIQUE has been developed for making sound in a theatre as controllable and as dramatically useful as is its light. Now, after 4 years work, and after checking the technique in over 30 performances, we find that not yet has there been a play which was not rendered more effective through the dramatic use of controlled sound.

By the "dramatic use of controlled sound" we mean increasing the effectiveness of the play: first, through the control of the *intensity* of any sound which may be used in the theatre; second, through the control of *pitch*; third, through the control of *quality*; fourth, by controlling the apparent *direction* from which the sound comes; and, fifth, by controlling the *form* of sound, that is, making it reverberant or non-reverberant as the play may demand.

It is axiomatic that in all cases the quality of the sound used in the theatre

must be such that the audience shall never be aware of the presence of sound-reproducing apparatus.

Once this fundamental condition has been realized in practice, it then becomes possible to induce physical, physiological and psychological reactions; for instance, hysteria can be induced in a theatre audience in about 40 seconds!

The technique of "controlled sound," which has been developed along dramatic lines (as will be described) in the theatre at Stevens Institute of Technology, involves only apparatus which is generally known to sound engineers. In fact, "auditory perspective" (see "The Third Dimension in Music," *Radio-Craft*, May 1934) is one of its most useful features—(though, for theatrical purposes the 3-channel system demonstrated by the Bell Laboratories is less useful than the mixing of outputs to 3 reproducers).

"Controlled sound," which overcomes many interpretive difficulties long confronting the playwright and producer, and which opens up a new field to establishing and controlling audience reaction, constitutes a new tool for the artists in the theatre.

Theatrical presentations appeal to the audience through the senses of *sight* and *hearing*. What the audience sees is controlled by the lighting; what the audience hears, heretofore has been limited by age-old mediums—the human voice, effect machines, and musical instruments. Now, by proper choice of locations for suitable types of reproducers, and by complete control of the audio output, the audio appeal may be made as flexible and complete as the visual appeal.

## EQUIPMENT REQUIRED

The reproducer system ordinarily used in the Stevens theatre incorporates 3 pairs of speakers (high- and low-frequency units—called, respectively, "tweeters" and "woofers") on the stage, 5 more speakers of various characteristics built into the proscenium

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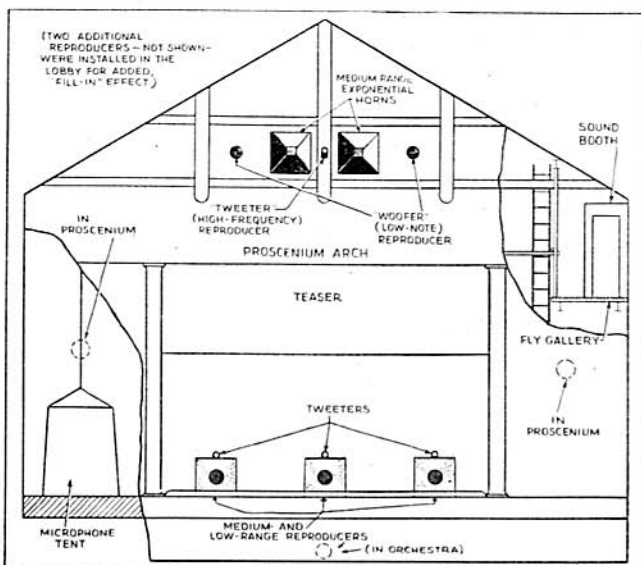


Fig. 1  
Pretentious set-up for controlled sound.



Fig. A  
Three mute performers appear lost in thoughts while the audience listens to those of the minister.



Fig. B, above  
Professor Burris-Meyer at the controls of the monitor control board in the Stevens Institute theatre.

Fig. 2, below  
A block illustration of one sound set-up.

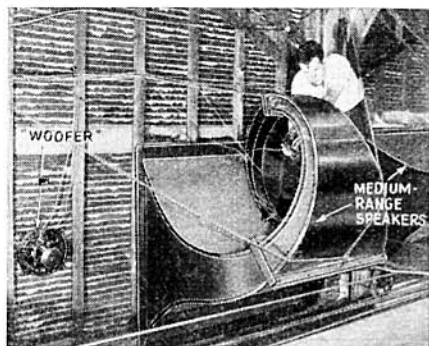
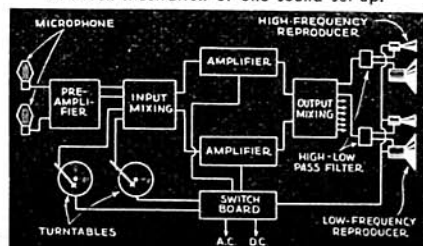


Fig. C, above. The proscenium-arch reproducers.

Fig. D, below. Speaker staging for demonstrating progressive sound.



## "CONTROLLED SOUND"

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arch, and still other speakers distributed about the auditorium wherever they may be necessary. Figure 1 shows one such set-up, requiring 16 reproducers, in "The Brainstorm" scene of "The Adding Machine," during presentation of "The Sound Show."

In Fig. A is illustrated an "alter ego" set-up—all the performers are mute—only the thoughts of the minister are presumably heard issuing from the sound system. Professor Burris-Meyer is shown, in Fig. C, at the controls of the monitor control board, and lending his voice as the "thoughts."

In Fig. C appear three of the five reproducers that perch high overhead in the proscenium arch. In Fig. D are shown three loudspeakers arranged in a row; a voice picked up by a single microphone is faded from one reproducer to the other, creating the illusion that the person stationary in front of the "mike" actually is moving across the stage. (Tweeters are not shown as they are not required in certain types of progressive sound—the tramp of feet on a dirt road, for instance; on cobble stones, however, tweeters would be needed.)

Two amplifiers are used and the source of sound may be disc or film records of any type of sound produced in front of microphones. The most unique feature of the installation is the mixing system which provides for mass flexibility, that is, the use of either or both amplifiers with any group of inputs and the mixing of all outputs from either or both amplifiers. (Figure E illustrates this equipment, in the main control room above the stage, being manipulated by one of the skilled operators—a student at the college.)

The following description of how this equipment was used in "The Sound Show," a presentation which was designed to illustrate the flexibility and adaptability of controlled sound, gives some idea of the technique involved.

### "THE SOUND SHOW"

So that the reader may gain a more realistic mental picture of just how controlled sound fits perfectly into the manuscript of a play, the following excerpts from the program of "The Sound Show" are presented.

#### OVERTONES

1. Speech from an identifiable but invisible source as applied to a play involving the alter ego.

#### HAMLET

Act 1—Scenes 4 and 5

2. Speech with unnatural, predetermined pitch and quality, and a translucent source.

#### THE ADDING MACHINE

Scene 6—A Pleasant Place

3. The reproduction and control of orchestral music as applied to a scene requiring fidelity, range of volume, and an invisible source of sound.

#### THE ONLY JEALOUSY OF EMER

A Play for Dancers

4. Speech in perspective as applied to pantomime.

#### THE ADDING MACHINE

Scene 2—An Office

5. The audible but unspoken aside; mental conflict expressionistically interpreted in sound and light.

The demonstration involved first the one-act play, "Overtones," by Alice Gerstenberg. This play involved the "alter egos" (other personalities) of two characters. The actress spoke the lines of the visible personalities. The invisible personalities were heard in the voice which was common to both personalities from whatever position the actress in question occupied but without the necessity of her opening her mouth. Absolute fidelity is required from this sort of reproduction which also involves perspective.

The ghost in Hamlet has always had a voice which sounded very much like a live man's voice. Moreover if the ghost is actually played by an actor the audience does not react to him very well, since no actor satisfies the translucent—has not the transparent or ethereal quality that supposedly characterizes disembodied spirits. In the Stevens production of the two scenes which involve the ghost, the ghost was



Fig. F. An Assistant "riding the gain."

produced by projecting a motion picture on gauze so that the resultant figure could move about, could appear to walk through walls and characters on the stage, and could be seen through and moved through. Through ordinary perspective the ghost was equipped with a voice which came from any position the ghost might occupy or which moved as the ghost moved. The voice itself was made to have an utterly unearthly but perfectly understandable quality which was not reminiscent of a radio or phonograph. This was accomplished by developing a special microphone technique and microphone designed for that specific purpose and by the use of filters to take out such frequencies as were undesirable.

A technique similar to that employed in "Overtones" was employed in a scene from Elmer Rice's "The Adding Machine" in which a man went mad and the audience was enabled to hear all of the racket which went on within his brain. The noise was composed of symbolical sounds generally accepted to indicate incipient mental derangement. As the insanity grew more and more apparent the volume was increased and the audience reaction was more apparent than it is in conventional productions of the same scene.

A dance pantomime was staged in which the dancers were supposed to carry long, and rather involved speaking parts as they moved about the stage. A dancer seldom has the breath to carry a long speaking part and for that reason they were furnished with voices in perspective so that voices appeared to come from the dancers no matter what positions on the stage they occupied or how fast they moved. In this case of course the voice could be suited to the character which the dancer was supposed to represent without the necessity of the dancer having that kind of a voice at all.

A scene from "The Adding Machine" which is accompanied by orchestral music has always been hard to produce since the orchestra has a tendency to drown out the actors or make them shout, and the scene is one which would be utterly spoiled if the actors shouted. The desired effect was secured on the Stevens stage by placing the orchestra in a room some distance from the stage, reproducing the music and at the same time picking up all the speech from the stage with other microphones, and then reproducing the speech at the same time the music was reproduced. The effect of this system made it possible for the actors' voices to be heard over the music no matter how loud the music played. (A project is now afoot to apply similar technique to opera.)

In the "office" scene from "The Adding Machine," the theatrical "aside" was demonstrated to be unnecessary. The characters, instead of speaking their straight lines and then turning from the audience and delivering asides which were not supposed to be heard by the other actors on the stage, said only their straight lines. The lines of the aside were heard in the voices of the actors and apparently from the position of the actors but the actors went about their business and did not open their mouths. The theatrical aside has always been a clumsy convention and it is now rendered unnecessary. (Continued on page 186)

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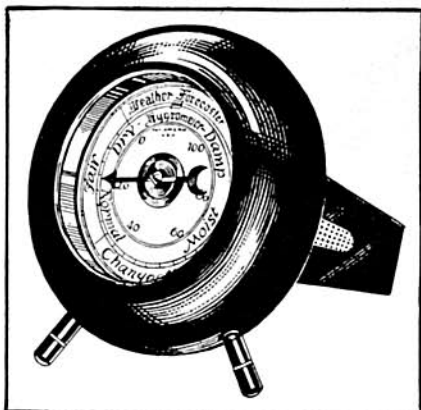
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## "CONTROLLED SOUND"

(Continued from page 185)

### TECHNICAL DETAILS

Figure 2 shows in block form the complete set-up of the sound system for "Strange Women," by Verdi, which demands that the audience feel a strong positive empathy toward the protagonist. Specially-designed velocity microphones were used. The microphones are usually located in a "tent" of heavy drapes set up in the wings. Due to the nearness to the loudspeakers, the directional characteristics of the microphones were very useful.

The two 3-stage resistance-coupled preamplifiers form a single unit and with their batteries are completely enclosed in a very heavy sheet-iron box. The mixing system provides for 3 inputs and 2 amplifiers which may be used together when desired. Also, on the same panel is the output mixing. By means of the complete panel it is possible to control the volume of each of the 3 inputs, the 2 amplifiers, any loudspeaker, and the system as a whole. Altogether, 11 attenuators are provided. (It may be easily seen that a man skilled in operating is desired. See Fig. E.)

Two 2-speed turntables are provided. However, very great care is required in the selection and use of records as, with a high-quality system standard recordings show many defects.

(Credit is here given to Mr. Daniel F. Hoth for his invaluable aid in preparing this article. Photos are by Halbran.)

Although the technique so far developed for the control of sound in the theatre is admittedly crude, two points stand out quite definitely: first, it is evident that controlled sound is a much more powerful means of creating audience reaction than many other devices which are used in the theatre; second, the critical consensus of leaders in the American theatre who have attended demonstrations of controlled sound at the Stevens theatre is that its general adoption is inevitable!

### SERVICING FORM

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Name .....

Address .....

Apt. .... Appointment.....

Type .....

Complaint .....

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Parts .....

Tubes .....

Aerial .....

Service Charges .....

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