

The Soundman

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Summary.—This paper outlines the tools and means that are at the disposal of the motion picture production mixer to enable him to fulfill his prime responsibility of being the director's assistant in all matters pertaining to sound. A parallel is drawn between the work of the soundman and the cameraman. Particular emphasis is placed on the artistic capabilities and qualifications required by the mixer to ensure the degree of confidence and co-operation that must exist among the soundman, the director, and the cast in order that sound may contribute its full share to the realistic quality of the final product.

With the introduction of sound into motion pictures, revolutionary changes took place in all branches of the industry. The silent picture had relied upon pantomime and printed titles to tell its story. Now, with the addition of the spoken word, musical accompaniment, and realistic sound effects, the motion picture presented to the public, for its enjoyment and education, real life as experienced by each of us from day to day.

This new medium of expression called for new techniques in writing, acting, photography, set design, stage construction, laboratory processing, and all the many phases of motion picture production. A new science, the science of the transmission and recording engineer, had wrought a change in an art and only by the complete and proper welding of this science and art could the motion picture realize its full capabilities.¹

During the twenty years of its growth, therefore, it is to be expected that the sound picture would produce many and varied changes in the personnel manning its production staffs and crews. By no means the least significant of these has been the evolution of the sound engineer from a man of mathematics, transmission circuits, recording equipments, and gadgets, with a foreign language of decibels and gammas, to the artist in whose hands rests the full dramatic impact which sound can impart to the motion picture of today.

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Who is this sound engineer who has contributed so much during the past twenty years to the revitalization of the motion picture industry? What are his functions, and what does he accomplish?

First, let us glance at the organization of a typical sound department. This group is headed by the director of sound recording, whose position is both administrative and technical in character. He has complete authority with respect to the operations of his department, and it is his responsibility to secure the best recording possible at a reasonable cost of operation under a wide variety of recording conditions. He must co-ordinate the technical efforts of his department with the functions of other studio groups, and he is vitally concerned with the quality of sound reproduction of his product in the theater. In handling the many operations with which his department is concerned, he is assisted by a chief engineer, who is responsible for all of the technical phases of sound department operation, including the installation, operation, and maintenance of studio recording and reproducing equipment and the development of improvements in technical facilities.

The functions of the personnel of the department may be roughly divided into four major classifications:

- (a) Production recording;
- (b) Music recording;
- (c) Rerecording or dubbing;
- (d) Engineering and maintenance.

The operating groups in each of classification (a), (b), and (c) are headed by men known as "mixers", a designation derived from their operational function of mixing together the various sounds picked up by a number of microphones, or transmitted to a control panel from an assortment of sound tracks during the rerecording process.² It is with the mixers that we are here primarily concerned.

These men were originally recruited largely from the telephone and radio engineering fields, and in the majority of cases have reached the present state of efficiency in their art as a result of fifteen or twenty years of training and experience in the recording of sound for motion pictures.

Let us consider the production mixer. In the early days of sound recording, one of the greatest limitations imposed upon the director was the restriction in movement of the actors by virtue of their having to speak in specified fixed positions at which microphones were

suspended and hidden from the camera view. The only way in which an illusion of freedom of movement could be obtained was by the use of many microphones positioned along the path traveled by the actor. By smooth fading or switching from one microphone to another, a reasonably smooth and continuous recording was obtained.

Of necessity, this type of microphone pickup technique required that the mixer be extremely expert in the noiseless, rapid, and accurate manipulation of the microphone switches and controls. The actor had to speak the dialogue exactly as written in the script, word for word, and switching from microphone to microphone had to be accomplished with split-second timing between words and during pauses for breath. The mixer's attention was focused entirely on the operation of his equipment; and if the dialogue could be understood and was recorded with sufficient volume, all was well.

With the development of microphones that could be used at some distance from their associated amplifiers, and with the advent of microphone booms that could move the microphone rapidly and silently about the set,³ the fetters were gradually removed from the director and actor until today scenes are staged with no restriction whatsoever from the recording system.

Let us briefly review the tools and means that are at the disposal of the soundman to allow this freedom of movement and to help him create the illusion of reality upon the screen.

First and foremost, of course, is the microphone, which may be regarded as the ear of the recording system. But there is one great difference between the microphone and the human ear. The human ear has a brain, while the microphone is a robot. The ear is the means of transmitting outside sounds to the brain, which selects that which we wish to hear, and within reasonable limits, discards the rest. This faculty of concentration makes conversation possible in the midst of a crowd at a football game and enables us to select, from amongst several voices all talking together, the voice we wish to hear. The fact that we have two ears and the binaural sense of hearing aids this power of concentration by enabling us to identify the location of a source of sound.

A microphone has no such powers of discrimination, and picks up all sounds equally well within its range. It is necessary, therefore, for the soundman to create, artificially, conditions surrounding the microphone, so that it picks up only those sounds which he wishes to be heard. In creating these conditions the soundman becomes the brain

of the microphone. For example, the loudness of extraneous noises such as footsteps, traffic noises, and crowd noises, must be reduced to a level which sounds unnaturally low to the ear in order to sound like a natural background through the microphone. To simulate further a sense of concentration, the microphone itself has been designed to have directional properties.

Various types of microphones are available for the soundman's use, depending upon the conditions under which they are to be used and the type of material to be recorded. The unidirectional microphone^{4,5} is so designed that it has a maximum sensitivity to sound waves originating in the front or operating side of the microphone, while sounds generated at the rear of the microphone are considerably attenuated, giving approximately a 10:1 ratio of desired to undesired pickup. This type of microphone is, therefore, most useful in reducing the level of such undesirable noises as camera noise, floor squeaks, dolly noises and sounds reflected from walls and other reflecting surfaces.⁶

The dynamic-type microphone also is widely used in production recording.⁷ While fundamentally nondirectional, it may be given certain directional characteristics by the addition of directional baffles mounted in front of the microphone diaphragm. This type of microphone is usually smaller and lighter in weight than the unidirectional microphone, and is less sensitive to and more easily protected from wind pressures, with their resulting thudding and thumping noises. This microphone is, therefore, most suitable for exterior work, and its light weight permits it to be suspended from the end of a hand-held pole where the shooting conditions do not permit the use of a microphone boom. Long dolly shots, the cramped interiors of boats, airplanes, automobiles, and small sets are examples of such conditions.

A third type of microphone, widely used in the recording of music, is the velocity- or ribbon-type microphone.⁸ This microphone may be termed "bidirectional" in that sound waves approaching it from either front or back have the maximum effect, while sounds approaching from the sides have little or no effect upon it. Its directional characteristic being practically independent of frequency, it is admirably suited for high-quality music recording work.

A number of sound concentrators⁹ have been designed, and while the quality of sound picked up by them is inferior in some respects to that obtained with standard microphones, they have been used quite successfully in recording sound effects where the source of sound might

be in some inaccessible place or where extreme segregation of wanted from unwanted sounds is necessary.

It happens in the recording of sound for motion pictures that extraneous sounds may occur which are detrimental to the scene and are beyond the control of the mixer. For example, during the recording of exterior scenes, airplanes may pass overhead, wind may cause excessive rustling in the trees, quiet lapping of surf at the beach may turn into pounding waves. Here the director is dependent on the soundman's judgment for the best procedure from both the artistic and economical standpoint.

As previously mentioned, the microphone is a one-eared device which causes the apparent loudness of off-stage sounds to be exaggerated. The soundman, therefore, is the only one who can say whether extraneous sounds are unduly loud or annoying or detrimental to the scene. The soundman must decide whether such disturbance justifies another take, whether the disturbing noise could be eliminated in rerecording or whether it would be more economical to "post-synchronize" the scene.

When the soundman decides that it would be most advantageous to post-synchronize the scene, the recording that he makes while the scene is being photographed serves merely as a cue track which is played back to the actors at some later date and serves as a guide to them in synchronizing a new sound track to match the picture. The post-synchronizing work is done in a special recording room where the soundman has means for controlling the acoustical conditions so as to enable him to match the acoustical conditions prevailing at the time of shooting the original material.¹⁰

A number of auxiliary aids are available to the soundman to adapt his microphones further to unusual shooting conditions. He may use a fine-mesh silk cover, called "wind-gag", to enclose the microphone completely as a protection against wind; or he may use a specially designed sound absorbing waterproof hood over the microphone as a protection against rain. Special electrical networks, known as equalizers, can be used to change the character of the sounds picked up by the microphones, filters are used to attenuate or even eliminate certain sounds,¹¹ electronic compressors¹² may be inserted into the recording system to assist in keeping the lowest spoken syllables and the loudest shouts within comfortable audible range for the listening audience.¹³

Having determined the type of microphone to be used, microphone

placement, like camera angle, must be carefully chosen. The cameraman paints his picture with lights and shadows—composition and perspective are carefully chosen—a mood is created. And so with the soundman, acoustic conditioning of the set for optimum sound quality is done; correct sound perspective is secured; the necessary degree of sound “presence” to match the photographed image is determined; the loudness of extraneous sounds is so established as to create a sense of concentration upon the wanted sounds without losing the effect of reality. In other words, a sound picture is painted which, in all respects, is complementary to the optical picture captured by the camera lens.

While the cameraman is concerned solely with the quality and quantity of reflected light, the soundman is concerned with the quality and quantity of both incident and reflected sound and only by a critical and judicial blending of the two can the illusion of true sound perspective be obtained.

It may happen that considerations of cost and construction difficulties preclude the use of materials in the design of a set which will permit suitable acoustic characteristics. For instance, it would be impractical to build a cell block of concrete or a subterranean cave of rock. In such cases, the soundman resorts to the use of reverberation chambers and acoustic labyrinths which enable him to add any desired degree of reverberation to his recordings.¹⁴ But should the reverberation in his original material be excessive, it can never be removed, and consequently is to be avoided at all costs.

Close collaboration is, therefore, required between the soundman and the art director during the planning and construction of sets. Large parallel surfaces must be avoided; deep recesses and alcoves in which dialogue may be spoken must be acoustically treated to prevent the speech from sounding “boomy”; large glass reflecting surfaces may have to be substituted with fine-mesh silk cloth; ceilings visible to the camera must be made of sound-transparent muslin; overhead beams that may interfere with movement of the microphone must be made removable. And so the production soundman sets the stage, the acoustical pattern is set, the microphone silently follows the actors about the scene, twisting and turning to catch each whispered word and registering every tiny inflection with true fidelity, weaving in and out to avoid casting shadows from the multiplicity of lights, raising and lowering to preserve correct perspective.

In present-day motion picture practice, the great majority of scenes are recorded with a single microphone. At first glance this would seem to indicate that the work of the mixer has been greatly simplified, but this is not the case.

Simultaneously with the improvements in the production recording equipment, have come improvements in reproducing equipments which, in turn, have called for infinitely greater attention to those factors which contribute to life-like portrayals of character on the screen. First and foremost, the mixer of today is concerned with "performance". Not the performance of his equipment—this is assured by competent maintenance crews, skilled microphone boom and recording machine operators—but with the performance of the actors and musicians whose art he is preserving.

The prime function of the mixer of today is to be the director's assistant and advisor in all matters pertaining to sound. To fulfill this capacity adequately he must necessarily be as familiar as the director and cast with all phases of the script. He should be thoroughly familiar with the plot, the dialogue, the characterizations to be portrayed and the locale and geography of each individual scene. He should appreciate the mood and tempo in which scenes are to be played and should always be conscious of what the effect will be on the scene he is recording, of the music and sound effects that will be added later in the rerecording process.

Often, directors will devote early rehearsals to a discussion of the significance, distinguishing qualities, merits, and demerits of the script. During these early discussions between the director and his cast, the soundman should always be present, seeking an understanding of all the characters, the setting of the play in time and place, the historical background, the customs of speech and the mannerisms of the era, and above all, the thoughts and psychology that lie behind the spoken words. Having thus obtained a comprehensive picture of the scenes he is to record, and having secured a complete understanding of the director's desires, it is the soundman's function to observe, purely by what he hears in his monitoring headphones, whether by voice pitch, loudness, tempo intensity, emotional quality, and mood, the actor is delivering the performance desired by the director.

Since it is common practice, for reasons of economy and expediency, to shoot scenes out of continuity, the soundman must exercise the keenest judgment in matching the quality of sound performance from day to day. He must thus assure a smoothness in the finished

product that will convey the impression of the whole picture being made as one continuous play-like performance.

While critically monitoring the scene being recorded, the soundman must see that there is no obvious effort on the part of the actor at so-called tone production and theatrical voice projection. There must be no obvious cultivation of careful diction. The mannerisms of speech must be those of the character delineated. The soundman must carefully draw the line between poor articulation that will result in lack of audience understanding of the story and pedantic artificialities that will destroy the illusion of reality. The soundman can quickly detect such faults in speech delivery as huskiness, nasality, throatiness, breathiness, where these characteristics are not required and result from faults in breathing, nervousness, superficiality of reading, an unemotional state of mind, or fatigue. Conversely, he can equally well detect the lack of these characteristics where they are necessary attributes to the characterization involved.

Since most scenes are shot with one camera, it becomes necessary for the actor to repeat his performance many times in order to obtain coverage of the scene from a number of camera angles. This frequent repetition of the same dialogue can often result in a too glib reading of the lines, and the consequent superficiality of the scene becomes immediately apparent to the soundman. Since all the mixer's critical faculties are concentrated upon one thing—the sound of the scene—no one is better able than he to appreciate whether the actor is maintaining the feeling of spontaneity in his performance. Even though the scene may be rehearsed and played many times before the purely mechanical details of the shot may be considered perfect, at no time must the soundman permit the "illusion of the first time" to disappear from his recordings.

In many screen plays, the story covers the span of life of one or more characters. Here the soundman is confronted with the problem of guiding the actors through a smooth and logical aging of the voice. Make-up, costuming, and physical mannerisms can satisfy the eye in presenting an authentic visual passing of the years. The soundman must rely on a sensitive ear and keen judgment to be assured that the auditory illusion of the passing of time is equally convincing.

Outstanding examples of successful co-ordination of physical and aural aging have appeared in the performances of Paul Muni in "Louis Pasteur", Robert Donat in "Goodbye Mr. Chips", and Bette Davis and Claude Rains in "Mr. Skeffington".

In the shooting of pictures involving dual roles such as the two roles of "Kate" and her sister "Patricia", played by Bette Davis in "A Stolen Life", the difference in character of the two girls is largely dependent upon the differences in pitch, inflection, and tempo of their voices. In maintaining these individual characteristics, reliance was placed on the critical faculties of the mixer. He had to be certain that the differences once established were maintained from scene to scene and day to day.

It is frequently necessary for the soundman to see that voice quality and loudness conform to the geographical specifications of the scene. For instance, in the Warner Bros. picture "Cry Wolf", Barbara Stanwyck is thrown from her horse while riding in a lonely part of an estate. She is suddenly surprised by a man, her husband, whom she had thought dead. This scene could have been played in a fairly loud excitable voice, but when it is disclosed that the scene takes place near a caretaker's lodge in which her husband had been kept prisoner, we understand why the scene is played in the quieter and more emotional low, restrained voice.

It is the business of the actor to present to an audience overt behavior patterns which go under the name of emotion. The actor realizes that his voice is probably his most essential tool in reproducing these behavior patterns and it is to the soundman, therefore, that he looks for advice, assistance, and criticism in his efforts to create the inner life of the character he is portraying. Only by the closest cooperation among the director, the actor, and the soundman, and by the free and tactful interchange of ideas between them, can the last foot of film be sent to the laboratory for processing with the assurance that all is "OK for sound"

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DISCUSSION

Dr. J. G. FRAYNE: I would like to ask what sort of an educational background would be necessary to produce this apparent superman.

MR. GROVES: Our directors and producers feel that the soundman should have an education in dramatics. The question is always asked, "Should the soundman be an engineer?" I think the combination of the two would be ideal. The men who are now in the studios doing this work have had training in the best dramatic schools that can possibly be found, I think. As I said at the beginning of the paper, they have been working now for 15 or 20 years at this particular type of work, and they cannot help but have learned something from all the different types of actors, directors, and producers with whom they work.

Where a man would start out from scratch to become this kind of a man would be a problem. I do not think he could do it, really. The only place he could do it would be in the studio.

DR. FRAYNE: Isn't it possible some courses could be established in our universities which would lead to this?

MR. GROVES: Definitely yes, it would be a combination of engineering, covering the use of the equipment that is used, and also, of course, dramatics. The training would be equivalent to an engineering course plus the type of training that the average dialogue director gets. In fact, I think that a mixer should be the dialogue director. That is the sum and substance of the whole thing—a dialogue director with an engineering background.

MR. J. I. CRABTREE: To what extent is post-recording used? Are songs always post-recorded, or are they ever recorded at the time the picture is taken?

MR. GROVES: As far as songs are concerned, very few of them are post-

recorded. They are mainly prerecorded. That is, the song is recorded before the picture is shot, and the person is photographed mouthing to a playback of the prerecorded music, but post-synchronizing is used where, for some reason or other, it is impossible to get a sound recording at the time of photographing the scene. Then, the track is recorded in synchronism with the photographed picture. All foreign versions are made with a post-synchronizing technique. Sometimes an original sound track is used as a cue track and played back to the actors under more favorable conditions to obtain a better sound track. That is being used more and more.

MR. JOHN HAWKINS: I wonder if you would comment on the difficulty of communication between the mixer who speaks one language, the musical director who speaks another, the director of the set who speaks another, and lastly the producer?

MR. GROVES: I do not believe that a mixer on a production company, who is qualified to be responsible for the sound on that production, will necessarily speak a different language from the director. I think in most cases they do speak the same language, but it is quite possible in the music scoring work that they will speak a different language. The scoring mixer, I believe, should have quite a musical education, musical training, and should be fairly well conversant with orchestration so he can talk the language of the musicians. If he can speak their language, he necessarily inspires much more confidence, and they believe his criticisms of balance, and often will change orchestrations to obtain greater clarity in the recordings. I think it is very essential that the scoring mixer be able to speak the language of the musicians.